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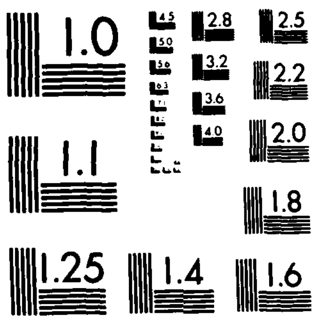

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Final Interim Report

Archaeological Investigations in the Upper Tombigbee Valley, Mississippi: Phase I

Judith A. Bense, Editor

With the Assistance of

Jerry R. Galm and David H. Dye

CONTRIBUTIONS BY

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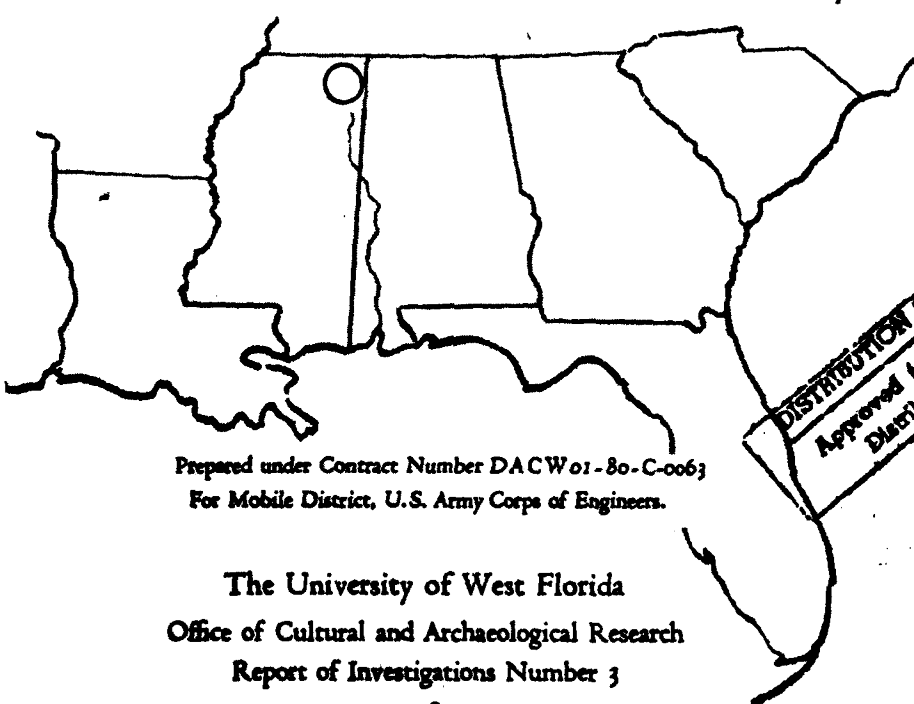
Volume 1.



Prepared under Contract Number DACW01-80-C-0063
For Mobile District, U.S. Army Corps of Engineers.

The University of West Florida
Office of Cultural and Archaeological Research
Report of Investigations Number 3
1983

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER Vol. I	2. GOVT ACCESSION NO. AD-A126 690
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Archaeological Investigations in the Upper Tombigbee Valley, Mississippi: Phase I	5. TYPE OF REPORT & PERIOD COVERED Final 1981-1983
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Judith A. Bense, Editor	8. CONTRACT OR GRANT NUMBER(s) DACW01-80-C-0063
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of Cultural and Archaeological Research, University of West Florida, Pensacola, FL	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Environmental Compliance Section US Army Corps of Engineers, Mobile District PO BOX 2288, Mobile, AL 36628	12. REPORT DATE 1983
	13. NUMBER OF PAGES 830 ~~plus microfiche~~
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) same as no. 11	15. SECURITY CLASS. (of this report) Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Midden Mounds, Archaic, Woodland, Tombigbee, Mississippi

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

See reverse side

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Block 20 - Abstract

This document is a report of archaeological investigations at eleven sites in the Canal and River Section of the Tennessee-Tombigbee Waterway. These investigations include the excavation of four sites and the testing of seven others. This report is a description of this project and includes the research design, a summary of the archaeological background, and a full description of the data recovery methods and techniques. For each site investigated in the project, a complete report of the specific procedures and a description of the results are provided. A summary of the total results is also contained in the final chapter. Attached to the report are a series of special studies, manuals for field, laboratory and data methods, and the original detailed research design. Also included is a complete data set on microfiche which presents the location, classification and measurement of all specimens recovered in the project.

The results of this 15 month field effort contributed much to our understanding of the Archaic and Gulf Formational State, specifically, the Early Archaic (Kirk), initial Late Archaic (Benton), and late Gulf Formational (Alexander). Isolated components of these cultures have been recovered and provide primary data for the reconstruction of chronology and lifeways of these portions of the prehistoric occupation of the Upper Tombigbee Valley. With additional, more intensive study of the recovered material, it will be possible to address the cultural process issue of adaptation to the post-glacial climate maximum, the Altithermal. Obvious differences in site use and area settlement pattern, subsistence strategy and scheduling, and technology were employed between ca. 6500 and 5500 B.P.

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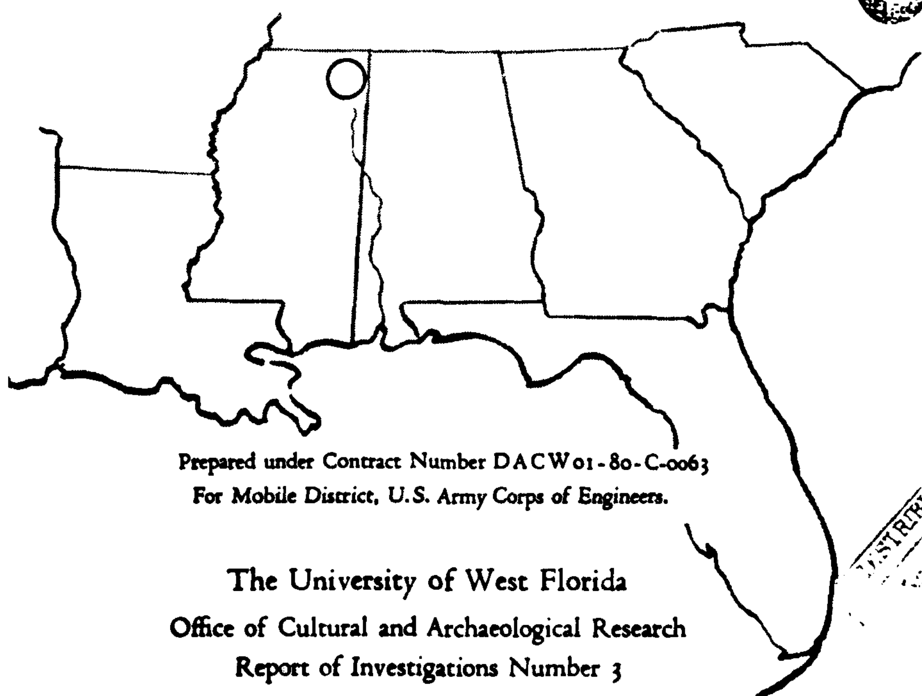

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ASSEMBLER'S PREFACE

This report consists of four separately bound volumes. The first three volumes are comprised of the description and results of the work performed in Phase I of this project. The research study design and four appendices are contained in the fourth volume; they include the Special Studies Reports, Laboratory Manual, Field Manual, and Data Management Manual. The complete data set is presented in the two other appendices which are on microfiche and are inserted in pockets at the end of appropriate chapters.

This report was written primarily by the senior staff and principal investigator of the project. Others also contributed to the report, and specific authorship is presented within the table of contents. This should be used for specific citations within this assembled work.

This report was compiled over the course of two years. The format and organization of the text, tables, appendices, and supplements were established in 1980. An outline went through several drafts with the Mobile District U.S. Army Corps of Engineers. The editors implemented the agreed upon format and outlines.

We have tried to make this report consistent in information, level of work, and method of presentation. With multiple authors and a diversity of research interests and experience, it is inevitable that internal differences occurred. This assembler has attempted to smooth these differences and it is hoped that this effort was reasonably successful.

Judith A. Bense, Ph.D.
Principal Investigator

Dallas A. Blanchard, Ph.D.
Co-Principal Investigator

ABSTRACT

This document is a report of archaeological investigations at eleven sites in the Canal and River Section of the Tennessee-Tombigbee Waterway. These investigations include the excavation of four sites and the testing of seven others. This report is a description of this project and includes the research design, a summary of the archaeological background, and a full description of the data recovery methods and techniques. For each site investigated in the project, a complete report of the specific procedures and a description of the results are provided. A summary of the total results is also contained in the final chapter. Attached to the report are a series of special studies, manuals for field, laboratory and data methods, and the original detailed research design. Also included is a complete data set on microfiche which presents the location, classification and measurement of all specimens recovered in the project.

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CHAPTER 1

INTRODUCTION

INTRODUCTION

This document is a report of archaeological investigations conducted in the Tennessee-Tombigbee Waterway in northeastern Mississippi by the University of West Florida, Office of Archaeological Contracts from January 1980 to March 1981. The work was performed under contract (DACW01-80-0063) with the U.S. Army Corps of Engineers, Mobile District. This report is a description of the work performed, the data recovered, and preliminary hypotheses generated during Phase I of the contract. The archaeological investigations included the mitigation of four sites and the testing of seven sites between Aberdeen and Ryan's Well, Mississippi (the Aberdeen Pool through Lock E of the Tennessee-Tombigbee Waterway).

DESCRIPTION OF THE PROJECT

THE TENNESSEE-TOMBIGBEE WATERWAY

The U.S. Army Corps of Engineers was authorized to construct a navigable waterway between the Tennessee and Tombigbee Rivers when Congress passed the River and Harbor Act of 1946. Twenty-six years of planning and restudy elapsed before construction began on the Gainesville Lock and Dam in 1972. The route of the waterway (Figure 1.1) runs north from its southern terminus at Demopolis, Alabama, to the East Fork of the Tombigbee River. It proceeds up Mackey's Creek, a tributary of the East Fork of the Tombigbee River, through Bay Springs, over the divide cut separating the Tombigbee and Tennessee River drainages, and then debouches into Yellow Creek, a tributary of the Tennessee River Pickwick Landing Reservoir near the common boundary of Alabama, Mississippi, and Tennessee.

The waterway project has been divided into three sections. The southernmost portion is known as the River Section, which consists of a section of the Tombigbee River made navigable by widening its banks, cutting through oxbows and narrow bends, and constructing four artificial lakes, each with a lock and dam complex. The Canal Section roughly parallels the East Fork of the Tombigbee River. A series of five locks level out the gradual rise in elevation that occurs in this section. The Divide Cut Section includes the Bay Springs Lock and Dam and the 43 km cut through the ridge that divides the Tombigbee Valley from the Tennessee Valley. This cut attains a maximum depth of 53 m at the peak of the divide. The waterway then empties into Yellow Creek at the northern terminus of the Divide Cut.

CULTURAL RESOURCE MANAGEMENT IN THE TENNESSEE-TOMBIGBEE WATERWAY

Cultural resource management of the archaeological resources within the Tennessee-Tombigbee Waterway project area began in 1970. The first investigation conducted within the waterway was the survey of the proposed Gainesville Lake section funded by the National Park Service. At that time Public Law 86-523 required the National Park Service to administer archaeological studies at federal reservoir projects prior to their construction. However, no specific funding authorization was stipulated for this purpose. This situation was ameliorated when Public Law 93-291 was signed in May 1974. This law broadened the responsibilities of federal agencies and authorized them to expend up to one percent of the total construction cost of a federal construction project for studying cultural resources that will be destroyed.

Cultural resource compliance procedures were largely considered on a site-by-site basis before 1978. These procedures were in accordance with 36 CFR 800, the Advisory Council procedures for fulfillment of Section 106 requirements of the Historic Preservation Act of 1966 which was amended. Determinations of eligibility and Memoranda of Agreement were not required during the early stages of the work conducted by the National Park Service. Both processes were first employed in mid-1975. The number of identified sites steadily grew after 1975. All of the necessary cultural resource mitigation procedures were soon completed within the Divide Cut Section of the waterway as a result of the implementation of these processes. Only the sites within the Bay Springs project area remained uninvestigated by cultural resource mitigation studies.

The Corps recognized that previous archaeological surveys had not fully examined portions of the waterway in areas not covered by the previous memoranda. These early projects consisted of provisional general surveys of a limited number of impoundment areas. The first surveys conducted in the Mississippi portion of the waterway covered the route from the Alabama border to the Tennessee River in less than two months (McGahey 1971; Lewis and Caldwell 1972). Later surveys divided the Mississippi portion of the waterway section into smaller units. This strategy permitted a more detailed investigation of these areas (Rucker 1974; Blakeman 1975, 1976). Severe time limitations, large study areas, and poorly defined boundaries still continued to cause major research problems during the initial surveys. This situation was largely repeated in Alabama. A cursory survey of the Gainesville Lake area (University of Alabama Museums 1970) was followed by a limited series of excavations (Nielsen and Moorehead 1972; Nielsen and Jenkins 1973). A survey of previously neglected portions of the waterway was conducted in mid-1976 (Atkinson and Elliott 1978).

The construction schedule on the waterway was progressing at a rapid rate by February 1977. This rate was especially rapid in those portions containing resources not yet coordinated under the above mentioned compliance procedures. It was soon apparent that a mechanism had to be created that worked the findings of the previous surveys into a mitigation program capable of being carried out within the established construction schedules.

Almost 700 archaeological sites had been discovered within the limits of the waterway by 1977. It was then agreed that the establishment of a National Register District was the only feasible way to manage the diverse archaeological resources present within the waterway that had not been covered by previous memoranda.

The Tombigbee River Multi-Resource District was accordingly proposed by the U.S. Army Corps of Engineers and IAS-Atlanta and was approved by the Alabama and Mississippi State Historic Preservation Officers. The district, which encompasses a corridor 8 km wide and approximately 280 km long from Gainesville, Alabama to Paden, Mississippi, was formally declared eligible for the National Register of Historic Places on September 27, 1977 (U.S. Army Corps of Engineers 1977(2):1).

The Mobile and Nashville Districts thus entered into a cooperative agreement with Inter-Agency Archaeological Services-Atlanta, National Park Service to develop, manage, and conduct the cultural resource program within the Multi-Resource District.

A mitigation plan was developed and adopted when the Advisory Council on Historic Preservation ratified the Memorandum of Agreement for this portion of the waterway in December, 1977. Both the Alabama and Mississippi State Historic Preservation Officers approved of the ratification of the Memorandum of Agreement.

This program was formulated to mitigate the adverse impacts on cultural resources within the district. Two fundamental and separate mitigation strategies were proposed: preservation or conservation, and data recovery. Preservation was defined as the perpetual maintenance of identified culture resources. Although some preserved properties will be lost, future development needs and research requirements almost certainly will require the excavation of a number of these locales. The data recovered during their excavation, however, ultimately serve the national interest.

The mitigation plan consisted of four stages (U.S. Army Corps of Engineers 1977(1)). Stage I consisted of the determination of the presence or absence of survey bias in the sample of archaeological resources provided by previous surveys. Stage II was the evaluation of the relative significance of components, data

categories, and types of information likely to result from more extensive investigations. Stage III set the excavation priorities of those sites judged as having the highest potential for addressing the critical research problems revealed during the preceeding stages of the evaluation procedure. Stage IV was a multi-stage testing program to consider potentially significant sites for which insufficient data are available for evaluation. Data concerning these sites were subsequently fed back into Stage III and their proper excavation priorities were assigned.

Each of the sites scheduled for impact was processed through a site selection flow chart (Figure 1.2). Seventy-seven sites did not possess sufficient data to fully pass them through the flow chart. These sites were tested in 1978-1979 (Bense 1982; Lafferty and Solis 1981) and have now been processed through the flow chart. All other sites encountered since 1977 in the waterway are processed through this flow chart.

PROJECT DEVELOPMENT AND DESCRIPTION

The project reported upon here developed out of the mitigation plan for the waterway. The testing program in the River and Canal Section (Bense 1979a, 1979b, 1979c, 1982) indicated that in the Upper Tombigbee Valley intact Archaic and Gulf Formational deposits were present in sites in the floodplain and on the Holocene Terrace. These deposits were usually contained in sites referred to as "midden mounds" (Galm 1978:33). These sites are composed of thick, deep, organically stained midden deposits that produce a mounded cross-section. This project was designed around the Archaic (and possibly Paleo-Indian) and Gulf Formational deposits in these sites in the Upper Tombigbee Valley (UTV). In previous waterway archaeological investigations, little or no information had been retrieved on the Paleo-Indian through Gulf Formational Stage. This situation increased the importance of the potential contribution of this project and was the primary developmental force.

The Scope of Work for this project originally stated that data recovery investigations were to be conducted at six sites and evaluatory investigations were to be conducted at three additional sites. Of the six sites to be excavated (Figure 1.1) two were midden mounds on the edge of the Holocene Terrace in the Aberdeen project in Monroe County (22MO710, 22MO752), three were midden mounds in the floodplain in the Canal Section (22IT539, 22IT576, and 22IT590) in Itawamba County, and one was a single component site at the base of the valley wall in the canal section in Itawamba County (22IT563). The three sites to be tested were 22MO531 and 22MO675 in the Aberdeen project and 22MO772 in the Canal Section below Lock A.

The original project consisted of three phases. Phase I included excavating six sites and testing three others. Phase II (optional) consisted of additional excavation at the sites tested during Phase I. Phase III (optional) will consist of special analyses of data recovered in Phases I and II.

These original plans for the project were modified during the course of the 19 months of Phase I efforts (January 1980 August of 1981). There have been two modifications to the Phase I Scope of Work and these are listed below.

This project was designed as a "package". The basis for this was twofold; 1)the establishment of consistent method for data recovery and analysis in 2)the investigation of a narrow range of site types with similar components. The development of expertise and insight was also enhanced by having the same organization perform long term investigations on these sites.

Modification One

The mitigation for 22MO710 and 22MO752 was changed from data recovery to preservation. This eliminated them from further work on this project. Also removed from the project was testing of 22MO772. This site had been destroyed by commercial gravel operations while still under private ownership. Added to the project was the testing of five new sites and the preservation of an aboriginal canoe. The five sites to be tested included 22IT606, 22IT621, 22IT622, 22IT623, and 22IT624 and were located in Locks C and D of the Canal Section. The dugout canoe was recovered during construction in Lock A. The required analysis, research and preservation of this specimen has been performed but is reported under separate cover (Purdy, Willis, and MacDonald 1982).

Modification Two

This modification added to the project audio visual documentation. This consisted of the production of one thirty minute color film, a handbook to accompany the film, and a series of six filmstrips with sound text and handbooks. The audio visual documentation will also be presented under separate cover.

In sum, the work performed in Phase I of this contract consisted of the following:

1. Data recovery at four sites: 22IT539, 22IT563, 22IT576, and 22IT590.

2. Testing of seven sites: 22MO531, 22MO675, 22IT606, 22IT621, 22IT622, 22IT623, and 22IT624.

3. Analysis and preservation of the Malone Lake Canoe.

4. Audio visual documentation of the project.

This report contains only the description of data recovery and testing investigations at the above 11 sites. The field work was conducted between January 1980 and March 1981. This Interim Report was prepared on a part time basis from September 1980 to March 1981 and on a full time basis from April to July 1981. From August 1981 through the time of submission, three chapters were written part-time in remote locations (Chapters 6, 7, and 8). The report was assembled and finalized in the field headquarters and the University of West Florida campus.

PROJECT ORGANIZATION

The overall project design was formulated in 1979 and is presented in detail in the Research Design (Supplement 1). Phase I was the first application of that strategy and, as expected, continual modifications and refinements were made. However, the primary variables of the organization remained relatively intact. The basic strategy utilized in Phase I will be summarized here.

Two factors conditioned the project organization: the construction schedule of the waterway and the nature of the sites to be excavated. The schedule, as presented in the Scope of Work, dictated that two complete teams had to be operating simultaneously to perform the required tasks. The nature of the sites to be excavated, as indicated in testing, necessitated that a full processing and analytical laboratory and data management system be operated concurrently with the fieldwork. Therefore, there were three sections of the project which operated simultaneously: Field, Laboratory, and Data Management. The evolution of the details of each section of the project during Phase I will not be presented here. What will be described is the system that did evolve and was fairly successful. Further refinements were made for Phase II as any strategy is a dynamic means to an end.

The staff of the project for Phase I was modified as experience was gained and weaknesses were identified. A Research Associate/Editor was necessary to co-ordinate all reports and maintain currency. The project had one Principal Investigator. The field and laboratory sections each had two directors with an assistant. A data manager with an assistant was needed for the project. The field and laboratory staffs each had two to four team leaders with up to five crew members each. A report produc-

tion team of word processor operator, draftsman, and photographer was also formed in the field for this Interim Report. Secretarial and administrative staffs were necessary both in the field headquarters and on the University of West Florida campus to process the requirements of a 75 - 80 person archaeological staff.

The project Senior Staff (Principal Investigator, Directors, Managers, and Assistants) were aided by a group of outside consultants which guided and monitored recovery and analysis of specific data sets. The consultants for Phase I were from the related fields of soil morphology, fluvial geomorphology, botany (including pollen, phytoliths, seeds, and spores), zoology, archaeometry, physical anthropology, and archaeology.

The field and laboratory staffs made determined efforts to develop and maintain consistent methods and procedures. These procedures are presented in Appendices IV and V. The data management system was greatly refined at the end of the first half of Phase I and those procedures are also presented in a manual (Appendix VI).

The integration of the laboratory, field and data management revolved around information feedback. The ideal of a "one day turn around time" of the printed out classification and distribution of excavated remains proposed in the project Research Design was not completely obtained. However, information was constantly exchanged by hand and/or machine between the senior staff of the project. It was in this manner that a relatively high level of information was maintained during data recovery. This provided the basis for sound decision making and cross checks.

A series of feedback sessions was conducted during the course of data recovery from each mitigated site. These were conducted after each third of the data recovery ("Thirdly Feedbacks") and were presented by the directors of each site (Lab and Field) and their assistants. In attendance at these feedback sessions were the federal agency representatives (Corps of Engineers, Interagency Archaeological Services), project staff and Office Director. These feedback sessions were the primary means by which the information was relayed, problems were discussed, and the strategy and solutions were devised between the federal and university representatives.

In sum, the organization of the project was designed to perform the required work at eleven sites within the specified limits of time and funding. The key to the strategy was feedback and the nature of the feedback was flexible. The exchange of information resulting from the concurrent laboratory processing and preliminary classification provided a firm base throughout the course of the project.

THE PHASE I INTERIM REPORT

This is the Phase I Interim Report and the primary purpose of this document is description. As required in the Scope of Work (6.d), herein is presented the description of each site and its environmental setting, the complete discussion of all methods and techniques, the complete artifact classification, and a description of the data recovered. In addition, the previous research and cultural resource management background is outlined as well as the special studies performed on the project.

The scope and duration of this project, the high artifact recovery, the problems encountered, and the short length of time to produce this report, combined to limit the integration of these data to a few undeveloped hypotheses. However, the data will be more closely observed and evaluated at the conclusion of Phase II, which will complete all project data recovery, during the preparation of the proposal for Phase III. This Interim Report is designed to present the data and the methods used to recover it in a raw and summary form. Hopefully, this can be used by professionals interested in the Archaic (especially Early) and Gulf Formational Stages in the Mid-South.

This report is organized into three parts: text, appendices, and supplements. Due to the unusual length, a series of volumes has been produced which contain subdivisions of the report. These are as follows:

Volume 1: Introduction, Summary of Previous Research, Environmental Setting, Data Recovery Strategy, and Archaeological Excavation at the Walnut Site (22IT539)

Volume 2: Archaeological Investigations at the Aralia Site (22IT563) and the Ilex Site (22IT590), and Archaeological Excavations at the Poplar Site (22IT576).

Volume 3: Test Excavations at 22IT606, 22IT621, 22IT622, 22IT623 and 22IT624, 22MO531, and 22MO675, Summary and Conclusions, and References.

Volume 4: Appendices III-VI: Special Studies Reports, Laboratory Manual, Field Manual, and Data Management Manual; and Supplement I: Research Study Design

Microfiche: Appendices I and II: Site material distribution tables and Cultural material in features; Supplements 2-4: ID Number provenience, Cultural material in ID Numbers, and Tool Measurement catalog.

PROJECT ORIENTATION

PROBLEM STATEMENT

We have sought to center our emphasis on several significant aspects of past human behavior. These include behavioral patterns which may be grouped into three major aspects of culture: economy, social organization, and ideology. While not ignoring social organization and ideology, our major concern here has been on cultural remains that have resulted from economic activities. Archaeologically visible patterns resulting from social organization (community plan, mortuary customs, and status) and ideology have been sought, but their resolution is more difficult because the data needed to confirm the relevant hypotheses in turn are more difficult to elicit.

A complementary focus of the investigations has been to establish a chronological framework for the Upper Tombigbee Valley. Although previous surveys, tests, and excavations have been conducted, portions of the resulting chronologies were developed without the benefit of multiple stratigraphic sequences. Culturally relevant questions of prehistoric behavior and adaptation are difficult to address without an adequate, detailed temporal scheme based on Upper Tombigbee Valley sites. Problem oriented questions concerning prehistoric patterns and processes could not be addressed without a detailed, firm cultural sequence of the Upper Tombigbee Valley. Therefore, the establishment of a refined chronolgy was an objective of this project.

ANTHROPOLOGICAL PERSPECTIVE

Introduction

This research employed a predictive economic model of hunters and gatherers based on explicit generalizations derived from ethnographic and ethnoarchaeological studies (Jochim 1976). Jochim's model "represents an attempt to assemble and codify observed cross-cultural regularities in economic goals and behavior". Its purpose is to generate "a set of predictions about the nature of a hunting and gathering economy in a particular environment" (Jochim 1976). The chief value of the model is that it allows us to generate a set of predictions about the way hunters and gatherers would use a given environment. We can compare these predictions to actual patterns of utilization for a great variety of activities and products.

Jochim (1976) notes that most archaeological investigations of prehistoric hunter-gatherer economies have been either too general or too specific. By explicitly stating our assumptions of

how hunters and gatherers interact with their environment based on regularities among observed ethnographic groups, we can formulate a coherent system of subsistence behavior that will be applicable to a number of research questions. Such a system may then be used to generate implications for comparison with the archaeological record.

General Assumptions

Consideration of prehistoric economies should be grounded in the theories of economic anthropology (Dalton 1977) because the problems encountered in studying present-day hunting and gathering economies indicate which cross-cultural regularities might have operated in the past. A primary assumption underlying Jochim's (1976) model is that economic behavior is the result of conscious choice. Selection of usable resources, decisions as to their proportional use and time of utilization, and demographic and spatial arrangements chosen in order to accomplish the exploitation, all use human time and energy. They also structure the subsistence and settlement patterns. Hunters and gatherers often expend small amounts of energy in the food quest; allotment of their expenditures depends on the available choices among competing or mutually exclusive activites.

Another assumption is based on resource selection. It represents deliberate choice rather than random or opportunistic utilization of resources. Local, temporal, and spatial variations of resources are present in all hunting and gathering societies, but we think that opportunistic utilization is a conscious decision to alter the usual patterned activities.

A third assumption is that the decision making process is a rational one. This assumption, as part of general decision-making theory, is appropriate for understanding the roles of choices and decisions that are made by hunters and gatherers.

The fourth assumption is based on the uncertain probabilities of outcomes which must be estimated. We assume this because the exact probabilities of the consequences of various economic choices are not known. At best they are estimated from previous experience and new information. This reduces the decision to a partial uncertainty.

The fifth assumption is that the choices are made to satisfy predetermined aspiration levels and not to maximize any specific measures. Decisions made under uncertain circumstances can best be viewed as a gambling situation. Essentially, alternative choices or competing objectives are considered, or the odds are calculated. This permits the establishment of an order of

preference. This principle is used as an important criterion because it represents an attempt to be descriptive. It incorporates decisions which involve procurement of generally nonedible items (hides, antler, and bone), and includes the ability to deal with conflicting goals or objectives.

The sixth assumption is based on a mixed strategy solution of resource scheduling. A mixed strategy solution is the combination of several options, such as: simultaneous performance of more than one activity, simultaneous exploitation of more than one location or region, or sequential changes of activities and locations.

The desire to limit effort underlies all economic decisions and is an important goal that guides the economic behavior of hunters and gatherers. It seems to be the minimization of effort (minimax theory) or the maintenance of its expenditure within a predefined range.

Organizational Principles

Two organizational principles are basic to Jochim's (1976) model. The first is that problems requiring solutions or choices can be conveniently formulated into systems. We view the decision-making processes of hunters and gatherers as a result of a set of decisions which resolve specific interrelated problems. The consideration of these problems is best accomplished through a system approach. Problem identification will determine the boundaries of the system. The objectives which determine the solution of the problems provide the goals for the system.

The primary structure of the model is the relationship of man to the natural environment. Because exploitation of the natural environment is culturally defined, the definition of exploitable and desirable resources depends partially upon technology and value systems. The ecological approach not only provides a structure for the focus and priority of exploitive activites, but it also allows us to utilize concepts taken from general ecological theory such as adaptation, stability, diversity, and trophic level.

The subsistence-settlement system can be interpreted as the result of problem solving situations. Scheduling and performance of economic activities in time and space can be seen as a response to three factors: resource availability, site placement, and demographic arrangement. Each may be considered a subsystem in the overall network of economic relationships.

Resource use is considered first because it tends to precede and condition site placement and demographic arrangements of hunter-gathering groups. Resources and subsistence activities are the primary factors that determine site placement and demographic patterns.

The most important factors conditioning the economic behavior of hunters and gatherers are their relationships with the natural environment. When these relationships are considered in a systemic framework, it is called the ecological approach. Human ecology considers a human population as part of the eco-system (Steward 1955). It focuses on the structural relationship of a group to its natural environment.

The multiple conditioning factors of economic behavior among hunter-gatherers are derived from either the natural or the social environments. Important factors in structuring the behavior of one group may have little significance to another.

Resource Use Scheduling

Goals

The primary function of economic activity is to provide the sustenance necessary for population survival. Although this is a biological fact, procurement is governed by many culturally defined objectives. A minimum aspiration level can be established based on the minimum number of calories, trace elements, or specific elements needed in the diet for survival of the population. The lack of large surpluses and large-scale redistribution systems in most hunter and gatherer societies and the presence of conflicting demands on time and energy indicate that the actual aspiration level is not far above the minimum. The maximization of caloric intake is not an objective among hunting and gathering populations.

To satisfy the food and nonfood needs of the population, a security level of income must be maintained. This involves minimizing risk. The total structure of the economy of many groups is shaped partly by this consideration and it determines the importance of different resources and activities. Generally, when two or more kinds of foods are available, one would predict that the population exploiting them should emphasize the more reliable source. Therefore, reliable food and sources of goods often determine site location.

Limiting effort is a second important goal guiding economic behavior of hunters and gatherers. The exclusion of certain resources seems to depend partially on the difficulty of their

exploitation. Not only selection, but timing of exploitation of most resources depends, to an extent, upon considerations of reducing effort or cost. For some groups the structure of the yearly economic cycle is partly determined by subsistence costs. Distance traveled to obtain the resource is part of the subsistence cost. An important objective of hunting and gathering societies is the reduction of effort to a predefined range.

A significant determinant of this level of effort expenditure is the need for some degree of population aggregation. Such aggregation, at least for part of the year, is usually suprafamilial. The average number of individuals in a local band of hunters and gatherers is usually 25. The purposes and apparent functions of the aggregations are varied. They may include the provision of mates, exchanges of foodstuffs, cooperative exploitation, trade in nonfood items, performance of ritual and curing, or sharing of information.

Thus there are two major goals guiding resource use decisions, based on generalizations of observed regularities among hunters and gatherers:

1. The attainment of secure level of food and manufacturing needs.

2. The maintenance of energy expenditure within a predefined range, determined partly by the need for population aggregation.

Some secondary goals include desire for good-tasting foods, variety, prestige, and maintenance of differentiation of sex roles.

Resources

The resources of the system are utilized in the decision making process of subsistence. Decisions depend on integrating informaion from a variety of sources: signs of animals, weather conditions, behavior of animals, dreams and visions, and hunters' past successes. The decisions depend largely upon the evaluation of signs regarding resource behavior and climatic patterns; and a detailed knowledge of the resource behavior is a trait of hunters and gatherers. This knowledge makes understandable their claims for the reliablility, efficiency, and adequacy of their subsistence systems.

Ethnographic Analogy

The archaeological record is at best a static pattern of associations and covariations among things distributed in space. Giving meaning to these patterns requires an understanding of the processes that created them. It is our view that this understanding is greatly enhanced by ethnological and ethnoarchaeological observations which help explain the archaeological record.

The ethnographic analogy uses the uniformitarian view of behavior; that is, human behavior in the past is directly comparable to that of the present. The types of processes operating within and between human societies now are the same as those operative in the past (Jochim 1976, Yellen 1976, Thomas 1979). Hypotheses also can be developed and tested from archaeological or ethnographic data and can be applied to the explanation of newly accumulated archaeological data. There must have been past forms or patterns of behavior which no longer exist anywhere in the world, but which may be identifiable from knowledge of the archaeological evidence in addition to knowledge of relevant general laws.

Two general types of ethnographic analogy exist: the folk culture or direct historical method, and the general comparative method. The direct historical approach is generally taken in areas where cultural continuity is strong and where various basic techniques and implements have been practiced and produced for hundreds or even thousands of years.

Using the general comparative method, ethnographic information can be gathered from anywhere, and can be used as an aid in archaeological interpretation. The logical framework for applying both kinds of analogy is the same. Regardless of their source the proposed analogies are simple hypotheses. As such they must be tested against independent data before they can be accepted.

Summary

The problem orientation of these investigations is centered around three aspects of culture: economy, social organization, and ideology. It was expected that data from economic activities would be most abundant in the archaeological record. Therefore, predictive models of hunters and gatherers based on ethnographic data and ethnoarchaeological observations were used as guides in our efforts to design this research. We attempted to take the knowledge of prehistoric economies, organizational principles, and resource use scheduling developed by Jochim (1976) and other anthropological experts of hunting and gathering societies and

apply it to this investigation of prehistoric hunters and gatherers in the Upper Tombigbee Valley. This resulted in specific data recovery methods, analyses, and a theoretical framework for interpretation. In this descriptive report much of our anthropological position will not be obvious to the reader, for it is actually employed in the second stage of research (lifeway reconstructions). However, the anthropological principles structuring these investigations were and will continue to be the linkage between the research problems, collection strategy, and analytical approach.

It is within the anthropological framework of cultural ecology that these investigations were designed. The current investigations of several sites which appeared to contain similar information provided the opportunity to test previous hypothetical models in a meaningful way. The unavoidable adverse impact of the Tennessee-Tombigbee Waterway on these sites provided the mechanism for this research.

The size, scheduling and location of the project required a certain organization and design. Flexibility and patience were the keys to its sucess.

Figure 1.1

Regional location map with sites investigated

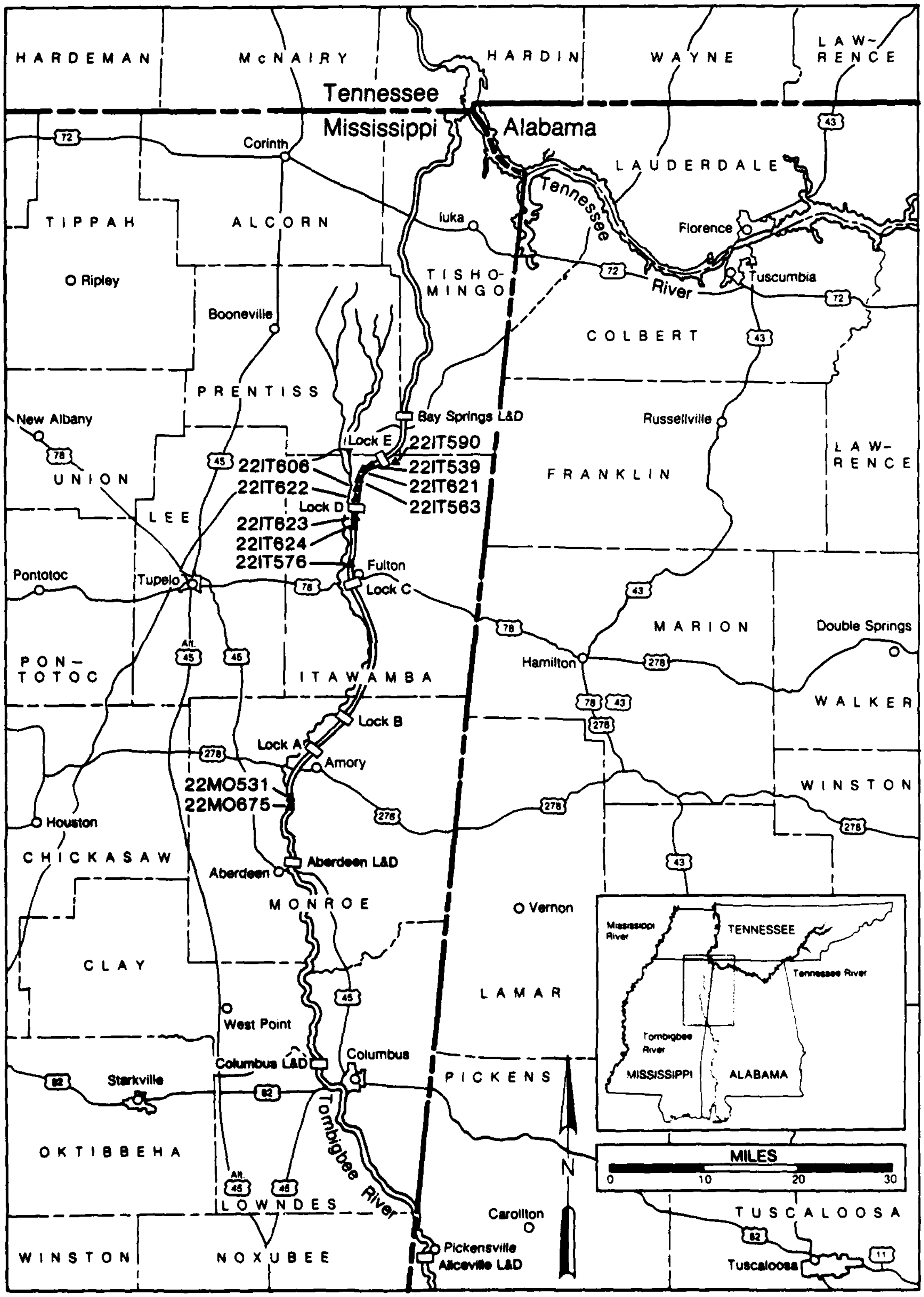
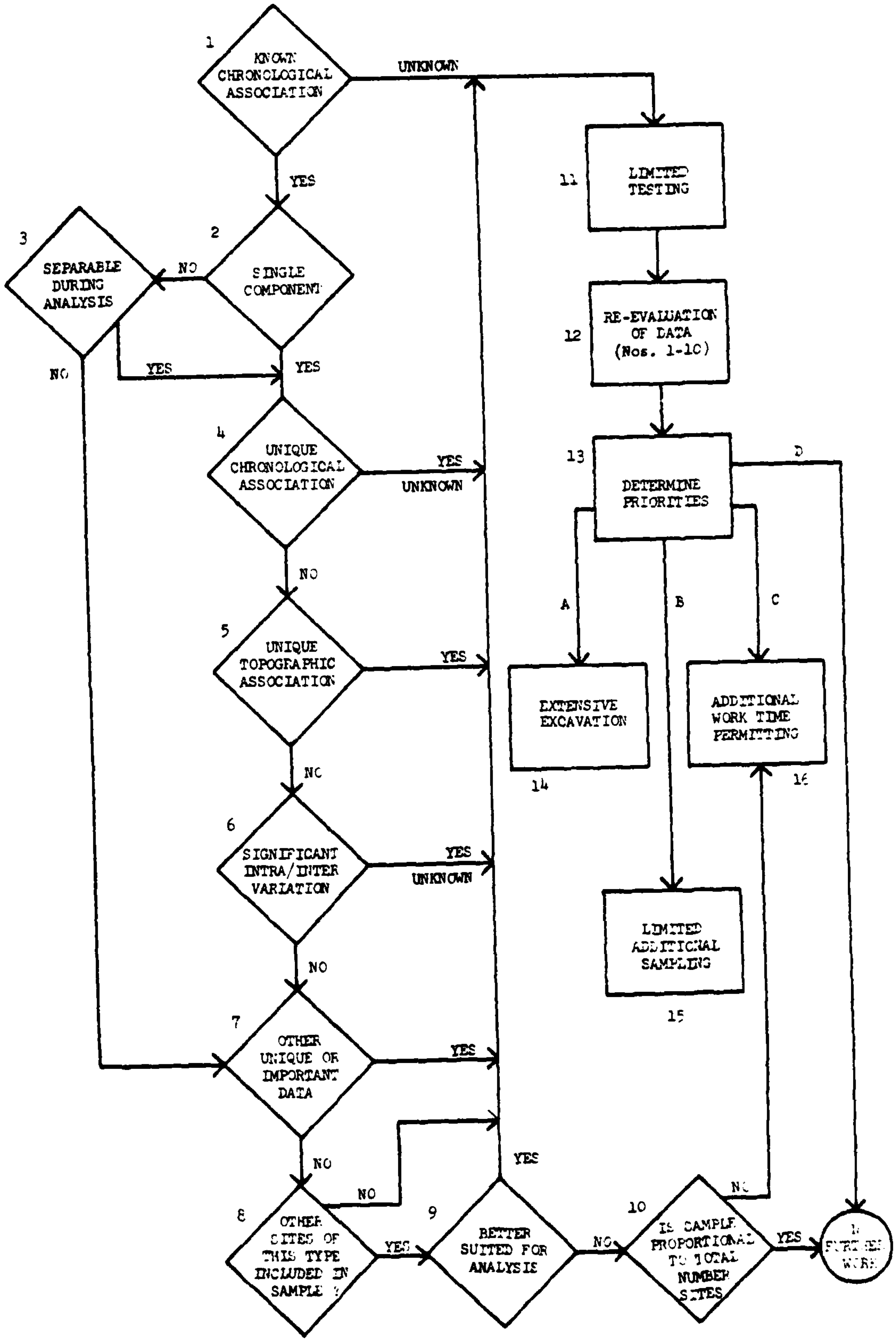

HARDEMAN
McNAIRY
HARDIN
WAYNE
LAW-RENCE
Tennessee
Mississippi
Alabama
Corinth
LAUDERDALE
TIPPAH
ALCORN
Iuka
Tennessee
Florence
Ripley
TISHO-MINGO
Tuscumbia
River
Booneville
COLBERT
PRENTISS
Bay Springs L&D
New Albany
Lock E
22IT590
Russellville
22IT606
22IT539
LAW-RENCE
UNION
22IT622
22IT621
FRANKLIN
Lock D
22IT563
LEE
22IT623
22IT624
22IT576
Fulton
Pontotoc
Tupelo
Lock C
MARION
Double Springs
PON-TOTOC
Hamilton
ITAWAMBA
WALKER
Lock B
Lock A
Amory
22MO531
22MO675
WINSTON
Houston
CHICKASAW
Aberdeen L&D
Aberdeen
MONROE
Vernon
Mississippi River
TENNESSEE
Tennessee River
CLAY
LAMAR
West Point
Tombigbee River
MISSISSIPPI
ALABAMA
Columbus L&D
Columbus
PICKENS
Starkville
Tombigbee River
OKTIBBEHA
MILES
0
10
20
30
N
LOWNDES
TUSCALOOSA
Carollton
WINSTON
NOXUBEE
Pickensville
Aliceville L&D
Tuscaloosa

Figure 1.2

Flow chart for site selection for mitigation in the Tennessee-Tombigbee Waterway


1
KNOWN CHRONOLOGICAL ASSOCIATION
UNKNOWN
YES
2
SINGLE COMPONENT
NO
3
SEPARABLE DURING ANALYSIS
YES
NO
YES
4
UNIQUE CHRONOLOGICAL ASSOCIATION
YES
UNKNOWN
NO
5
UNIQUE TOPOGRAPHIC ASSOCIATION
YES
NO
6
SIGNIFICANT INTRA/INTER VARIATION
YES
UNKNOWN
NO
7
OTHER UNIQUE OR IMPORTANT DATA
YES
NO
8
OTHER SITES OF THIS TYPE INCLUDED IN SAMPLE ?
NO
YES
9
BETTER SUITED FOR ANALYSIS
YES
NO
10
IS SAMPLE PROPORTIONAL TO TOTAL NUMBER SITES
NO
YES
NO FURTHER WORK
11
LIMITED TESTING
12
RE-EVALUATION OF DATA (Nos. 1-10)
13
DETERMINE PRIORITIES
A
B
C
D
14
EXTENSIVE EXCAVATION
15
LIMITED ADDITIONAL SAMPLING
16
ADDITIONAL WORK TIME PERMITTING

CHAPTER 2

SUMMARY OF ARCHAEOLOGICAL RESEARCH IN THE UPPER TOMBIGBEE VALLEY

HISTORY OF ARCHAEOLOGICAL RESEARCH IN THE UPPER TOMBIGBEE VALLEY

Knowledge of previous archaeological work in any research area is necessary before additional projects are conducted. The constantly changing archaeological data base and theoretical biases make it mandatory for one to be familiar with relevant research.

This history of archaeological work in the Upper-Central Tombigbee Valley is a summary of research that has been undertaken before 1972 and after federal funding was authorized in 1972. Implicit within these two sections is a major theoretical stance between archaeologists who eschew a "normative" framework and those who emphasize "culture process" interpretation.

The purpose of this discussion is not to point out major changes in field methods and laboratory techniques with regard to these theoretical concerns, but rather to update and synthesize a body of archaeological literature which is relevant to our current research interests.

ARCHAEOLOGICAL RESEARCH BEFORE 1972

Much of the early research in the Upper Tombigbee Valley has been summarized by Ensor (1981):

> Jesse D. Jennings (1941, 1944) conducted research in northeastern Mississippi from 1940 to 1941. The historic Chickasaw, who occupied this area of Mississippi during the contact period, were his primary interest. Four sites at Chickasaw Old Fields near Tupelo were investigated. He explored a large Middle Woodland (Miller) village area and associated mound group (MLe62), and several large Chickasaw villages (MLe14,18,19,and 10). The results of these excavations provided substantial information on Chickasaw and Woodland (Miller) components.
>
> The Miller sequence (Jennings 1944), established from work along the Natchez Trace, was the first attempt to define discrete cultural stratigraphic units in the Tombigbee Valley. Three prehistoric ceramic groups were defined on the basis of temper and surface decoration. Miller I was characterized by fabric-impressed, sand tempered, cord-marked and plain pottery, and Miller III ceramics were predominately clay/grit tempered or grog tempered.

> In 1951, Cotter and Corbett (1951) excavated five mounds and an associated village area (Bynum mounds) along the proposed route of the Natchez Trace Parkway in northeastern Mississippi. A Miller I mound group, containing burials and grave goods, was described, and chronological information based on earlier ceramic associations was gathered. Jennings's divisions of the Miller sequence into early, middle, and late periods were supported by this work.
>
> No major investigations were undertaken after this work in Mississippi until 1966 when Charles Bohannon (1972) excavated the Pharr mound group, consisting of eight dome-shaped Middle Woodland burial mounds. Details of mound construction and locations of features within the individual mounds were recorded. Bohannon attempted to refine the Miller ceramic sequence by drawing upon Jennings's pre-World War II surface collections and seriating the series. He identified Bynum as Miller I and the mounds that Jennings excavated as Miller II. In 1969, Hanson conducted a survey of the Town Creek Watershed in Lee County, Mississippi (Hanson 1969).

ARCHAEOLOGICAL RESEARCH AFTER 1972

After 1972 the entire complexion of archaeology within the Upper Tombigbee drainage changed. Federal appropriations in the form of contracts signaled a new era of archaeological work in the valley. Although not all research was federally sponsored, the majority was. Ensor (1981) continues his recapitulation of events after 1972 as follows:

> With the beginning of monetary appropriations for increased archaeological work along the Tennessee-Tombigbee Waterway in 1972, a number of surveys and test excavations were carried out (Lewis and Caldwell 1972; Rucker 1974; Blakeman 1975, 1976). Other monetary sources soon became available in the form of state grants. Marshall and Glover (1974) conducted an archaeological survey of Tishomingo State Park in the Bear Creek Watershed and found evidence of Early Archaic, Middle-Late Archaic, Gulf Formational, Middle Woodland, and Late Woodland cultures.

Such state funded surveys were rare near the waterway; federal projects were the rule. Rucker (1974) conducted survey and test excavations along the Tombigbee in the vicinity of Columbus, Mississippi. He recorded numerous Archaic, Woodland (particularly Late Woodland), and Mississippian sites. One primary contribution to the archaeology of this portion of the Tombigbee River was the test excavations at the Vaughn Mound. This "midden mound" was tested by Atkinson (1974) and found to contain numerous human burials. In addition to the burials, the mound possessed a stratified Archaic sequence with excellent faunal and botanical information.

Additional surveys and test excavations were conducted by Blakeman (1975) in the upper Central Tombigbee Valley. He tested several large "midden mounds" which contained primarily Archaic deposits. Late Gulf Formational, Woodland, and Mississippian occupations were also in evidence. Excavations at the Kellogg Mound and Barnes Mound demonstrated that stratified Archaic sites that contained Archaic subsistence remains in good context were present in the drainage.

Blakeman (1976) carried out additional archaeological survey work in the Aberdeen Lock and Dam Section of the waterway. Numerous sites were located which dated to the Archaic, Gulf Formational, and Mississippian stages. The survey located sites from the Aberdeen Lock and Dam to the Bay Springs Lock and Dam. The analysis of the survey data indicated that a strong correlation was present between Alexander and Wheeler ceramics. This suggested that the settlement pattern for these two cultures was similar and possibly reflected a similar adaptation. Blakeman also noted that occupation of the upper-central portion of the Tombigbee drainage was sparse during Early Archaic and Mississippian times. However, during Late Archaic, Miller II, and Miller III times, occupation was common. Two sites where these components were encountered were excavated in the Aberdeen area by Wynn and Atkinson (1976).

Atkinson (1978) and Elliott (1978) conducted a cultural resource survey of selected areas in the Tennessee-Tombigbee Waterway in Alabama and Mississippi in 1978. No attempt was made to further develop or test Blakeman's settlement model using the new survey data. Atkinson was in agreement with Blakeman's interpretation of the prehistoric settlement model for this portion of the waterway. Recent work in the lower portion of the Central Tombigbee Valley has been performed by Peebles (1981) at Lubbub Creek near Aliceville, Alabama. This Mississippian site contributed greatly to our understanding of this stage in the Tombigbee Valley. The works of Jenkins (1975); Jenkins, Curren, and DeLeon (1975);and Jenkins and Peebles (1982) in the Central Tombigbee Valley have established the chronology and ceramic

seriation to which all of the Tombigbee investigations are compared.

Further survey work was carried out by Robert Thorne in 1976 (Thorne 1976). He surveyed the Divide-Cut section of the waterway and located numerous Archaic sites. Representative components from all currently recognized cultural stages were found in the survey; however, the majority of the sites were Late Archaic and Middle Woodland. No attempt was made to correlate site location with geographical and physiographic variables or to develop settlement pattern models based on site types.

Charles Hubbert surveyed the Bay Spring's impoundment area during the summer of 1976 (Hubbert 1977). He located numerous sites, most of which were Late Archaic. All of the major cultural stages were represented in the survey. The author formulated a hypothetical model of settlement for this area of the waterway. Hubbert compared Blakeman's (1976) survey data from the upper Central Tombigbee Valley with his own. Blakeman's data, which had suggested minimal use of the entire Tombigbee Hills physiographic zone during Mississippian times, was upheld by Hubbert's Bay Spring's data which showed parallel cultural utilization during this time period.

In 1977, John Penman conducted several archaeological site surveys in northeastern Mississippi (Penman 1977). He surveyed the Town Creek and Mantachie watersheds, recording numerous small sites that were apparently seasonal occupations within the floodplain. More substantial occupations were also noted; fortified Chickasaw villages and Miller base camps were located on the second terraces in the Town Creek Watershed (Penman 1977:9). Most sites recorded were Miller II, Miller III, and Late Archaic. Other time periods were not well represented.

Bense (1979 a,b,c; 1982) conducted test excavations of previously recorded sites from Aliceville Lock and Dam northward to the canal section of the waterway. A total of 58 sites were tested using a combination of hand excavation, controlled surface collection, and mechanical recovery techniques. Components from all known cultural and historical stages were present within the sites. The evaluations of the sites indicated that both multi-component "plowzone" sites and stratified "midden mounds" were common occurrences in the upper Central and Upper Tombigbee drainage. Significantly, numerous early Archaic components were recognized, one in apparent stratified context. Other important components included Benton, Wheeler, and Alexander. Most "midden mounds" contained multi-component Archaic horizons usually capped with Middle to Late Woodland deposits. Features were encountered in many of the tested sites. Faunal and floral remains were common on many "midden mounds" sites; however, in general faunal remains were not well preserved. Most sites from the upper-

central portion of the waterway contained Miller II and Miller III components. In the upper limits of the drainage Archaic sites were more prevalent, with Middle to Late Archaic components well represented. In addition, Gulf Formational (Wheeler and Alexander) components were found. Mississippian and historic Chickasaw occupations were virtually absent in the research area.

Additional work has taken place recently in the Upper Central and Upper Tombigbee drainage. Four stratified "midden mounds" have been excavated by various universities. Mississippi State University conducted salvage excavations at two sites in the central portion of the waterway. James Atkinson dug investigated the Kellog Village site (22CL527) located in the Columbus Lock and Dam area (Atkinson, Phillips, and Walling 1980: 8). At this site a 1 m thick deposit spanned an 8,000 year prehistory, dating from the Middle Archaic period to the Mississippian Stage. A large Moundville I cemetery was unearthed which dated from A.D. 1000 to A.D. 1250.

Janet Rafferty and her co-workers excavated the East Aberdeen site (22MO819), a stratified "midden mound" located in Monroe County, Mississippi (Rafferty, Baker, and Elliott 1980). Components recognized at this site span a 10,000 year period from Early Archaic to Historic. Important prehistoric components include Big Sandy, Kirk, Dalton, and Greenbrier along with a major Benton occupation. During the Benton use of the site, which was C-14 dated at 3500 B.C., a wide variety of lithic implements and faunal remains occurred. The evidence may indicate that this was a base camp. The early Archaic and Middle to Late Woodland occupations appear to have been transitory.

A third "midden mound", the W.C. Mann Site (22TS565), has recently been excavated by Memphis State University. This site is located in the Yellow Creek drainage, Tishomingo County, Mississippi, (Peterson 1980) in the Divide-Cut Section of the waterway. It had been tested previously by John O'Hear (O'Hear 1977). Components ranging from Morrow Mt. (Middle Archaic) to Miller III (Late Woodland), including Late Archaic,and Gulf Formational Woodland deposits, were encountered. A significant Benton occupation was recovered and included numerous charred wood and hickory nuts. Bone was scarce. A large amount of fired clay also was found in the Benton zone. A large quantity of lithic material, including a "cache" of bifaces, was recovered. A series of radiocarbon determinations for the Benton occupation ranged from 3800 to 2200 B.C.

The University of Alabama excavated the Brinkley Midden (22TS729) in the Yellow Creek drainage. This was a large "midden mound" which contained stratified Archaic deposits. A major Benton occupation was represented and several large "anomalies" were uncovered which may represent Middle to Late Archaic structures

(Otinger and Lafferty 1980). Several Benton points, supporting the author's contention for an Archaic context (Otinger, personal communication), were recovered from the fill of these features.

Another stratified Archaic site located in the upper portion of the waterway is the Hester Site (22MO569), located near Amory in Monroe County, Mississippi. Brookes in his preliminary report (1979) presents an Early to Middle Archaic sequence based on projectile point forms. Cultural occupations by Dalton, Big Sandy, Kirk, Beachum, and Eva peoples were noted. The lithic artifacts associated with the various strata and levels in the site are described and a "Dalton Assemblage" is discussed. The stratified sequence, however, must be convincingly demonstrated through detailed distributional data before acceptance.

Other sites have been tested extensively or excavated thoroughly in the Upper Tombigbee drainage. Mississippi State University excavated the L.A. Strickland Site I (22TS765) in Tishomingo County, Mississippi (O'Hear and Conn 1977). Test excavations and bulldozer cuts exposed three Miller II pit features which had a weighted average C-14 determination of A.D. 644±62. The dated lithic assemblage from these pits was used by the authors to infer behavorial activities. They speculated that the site was a limited activity camp during Late Miller II times.

The University of Alabama investigated a multi-component site near the headwaters of the Tombigbee River in Itawamba County, Mississippi (Bense, Walker, and Partlow 1979). Site 22IT581 was a small multi-component site which contained Early Archaic, Gulf Formational, Middle Woodland, and possibly Late Woodland occupations.

An Early Miller II midden was encountered which contained a variety of lithic and ceramic artifacts. Pit features and postholes extended from the midden into the underlying subsoil. The restricted nature of the dark organic midden (11m) and its shape (oval) suggested a Middle Woodland structure had been probably present.

Numerous Early Archaic points, most of which were Kirk Corner-Notched, were recovered. A generalized Early Archaic assemblage, which consisted primarily of cutting and scraping tools, was described. Faunal and botanical materials were recovered from general excavation levels and pit features.

O'Hear conducted salvage excavations at several small lithic scatters in the vicinity of the Brinkley midden (22TS729) in the Yellow Creek drainage. Based partially on these investigations and some others, he proposed a model of Late Archaic settlement and subsistence for the Yellow Creek drainage (O'Hear 1978).

In addition to these sites, tests and excavations at several rock shelters in the Bay Springs segment of the waterway have been conducted by the University of Alabama (Lafferty and Solis 1980) and the University of Pittsburgh (Adovasio et al. 1979). These excavations have produced limited data at most localities; however, one shelter produced Archaic materials associated with floral and faunal remains (Adovasio et al. 1980). These data, along with the current investigations of several Early Archaic components in the Upper Tombigbee floodplain (this volume), promise to expand our knowledge of Late Pleistocene-Early Holocene events with regard to prehistoric cultures in the area.

Related to this aspect of prehistoric research in the Upper Tombigbee Valley is the geomorphological and paleo-environmental data reported by Benham Blair and Affiliates (Muto and Gunn 1980a). They developed a model for Early Man site location in the Tombigbee Waterway. No definite "Early Man" (i.e., Paleo-Indian) assemblages were recovered utilizing the model.

The scope of archaeological investigation along the Tennessee-Tombigbeee Waterway is tremendous. The survey, testing, and excavations carried out in the upper Central and Upper Tombigbee drainage have provided a data base seldom recognized in eastern North American prehistory. These data will prove invaluable in the current study as well as those in the future.

ABORIGINAL CULTURE HISTORY

INTRODUCTION

The following section is a brief summary of the cultural history of the mid-South applied to the Tombigbee Valley. For purposes of description and convenience, the valley has been divided into upper, central, and lower sections. The upper Tombigbee Valley includes the area from the headwaters (Moore's Mill and Ryan's Well, Mississippi) to Amory, Mississippi. The central valley includes that portion from Amory to Demopolis, Alabama. And the lower valley includes the area below Demopolis.

The following cultural history description will use integrative terms such as stage, period, phase, subphase, and horizon. This terminology is applied as it is defined in Jenkins (1982: 9-13) which was adopted from Willey and Phillips (1958). Stage is a developmental unit. Periods are essentially chronological units. Stages and periods are composed of phases. Phases are similar archaeological units limited in size to a region and limited chronologically to a brief interval of time. A subphase is a chronological refinement of a phase. And an horizon denotes a widespread phenomenon of limited duration.

PALEO-INDIAN STAGE (12,000 B.C. - 9,000 B.C.)

The Paleo-Indian stage is the least understood portion of the aboriginal occupation in the Upper Tombigbee Valley because of the lack of documented sites. This low archaeological visibility may stem from a relatively low population density or a subsistence/settlement pattern that resulted in scattered and briefly occupied camps. The low number of known Paleo-Indian sites also may stem from fluvial activity that either buried camps through flooding and silting or scoured sites away. The rarity of identifiable Paleo-Indian sites may result from both cultural and natural processes.

The best evidence for Paleo-Indian occupation in the Upper Tombigbee Valley is isolated surface and excavated, but apparently out of context, hafted bifaces such as Clovis, Cumberland, Beaver Lake, and Quad. These forms are grouped under the Lanceolate Paleo-Indian cluster (Ensor 1981: 174-175). Based on the amount of surface collected material from the nearby Tennessee Valley, the Paleo-Indian occupations of the Upper Tombigbee Valley are not as well represented as those in more northern areas of the Mid-South. The low number of Paleo-Indian sites in the Upper Tombigbee Valley may also result from its marginal postition to the Interior Low Plateau physiographic province where eastern Paleo-Indian sites are concentrated.

Three Paleo-Indian stage subdivisions have been established for the Southeast: Clovis (12,000 B.C. - 11,000 B.C.), Cumberland (11,000 B.C. - 10,000 B.C.), and Beaver Lake/Quad (10,000 B.C. - 9,000 B.C.). The lithic assemblage associated with these complexes includes a biface technology and a flake and blade technology that produced a variety of implements: biface knives, projectile points, choppers and uniface scrapers, drills, gravers, and knives. This assemblage was manufactured most frequently from Fort Payne chert, whereas later chipped stone industries usually employed Bangor chert (Futato 1980a: 115; Walthall 1980: 25-34).

Clovis sites occur in a wide geographic range in North America. In the Tennessee Valley these open sites are characteristically situated on Late Pleistocene terraces or lake and pond shorelines. Cumberland sites are restricted to the Interior Low Plateau and are found in a wider range of environmental zones than Clovis sites: upper floodplain terraces (open sites) and bordering uplands (open sites and rock shelters). Beaver Lake sites are distributed in much the same pattern as Cumberland sites. Quad habitation locales are found more frequently in the uplands and piedmont than earlier sites and commonly occur in the floodplain (Futato 1980a: 113-116; Walthall 1980: 25-34).

ARCHAIC STAGE (9,000 B.C. - 1,000 B.C.)

Early Archaic Period (9,000 B.C. - 5,800 B.C.)

Dalton Horizon (9,000 B.C. - 8,000 B.C.)

The earliest Archaic complex, the Dalton horizon, is widespread throughout the Southeast (Walthall 1980: 44-49). The diagnostic marker, the Dalton projectile point/knife, has a small to medium blade, lanceolate to pentagonal form, serrated blade edges, concave base, and ground haft area. The hafted bifaces in the Dalton cluster (Ensor 1981: 173-174) seem to have been frequently resharpened while the point was still hafted, creating a pronounced steeple shape.

Characteristic artifacts from the Dalton assemblage recovered at the Hester site (22MO569) in the Upper Tombigbee Valley (Brookes 1979: 17-31, 113-114) include spokeshaves, unifacial burins on blades, preforms, bifacial knives, gravers, bifaces, uniface end and uniface and biface side scrapers, cores, *pieces esquilles*, sandstone abraders and nutting stones, and quartzite hammerstones. Chert resources include yellow cherts and Fort Payne cherts. Dalton components are also recognized at 1GR1 and 1GR2 (Nielsen and Moorehead 1972) in the Central Tombigbee Valley. Dalton projectile point/knives were sometimes made from

Tallahatta quartzite which may have been traded from further south.

The settlement pattern includes open sites on upper floodplain terraces and upland rock shelters. Dalton settlements generally are located where earlier Paleo-Indian sites are found and where later materials are rare. Animals associated with Dalton materials outside the Tombigbee Valley include white-tailed deer, raccoon, rabbit, squirrel, gray fox, chipmunk, wood rat, porcupine, skunk, turkey, bobwhite, and turtle. Recovered flora from Dalton components includes hickory nuts and acorns (Walthall 1980).

Big Sandy Horizon (8,000 B.C. - 7,500 B.C.)

Big Sandy is a direct development out of the earlier Dalton complex. The diagnostic marker for this horizon is the Big Sandy projectile point/knife cluster (Ensor 1981: 172-173). From evidence at the Hester site (22MO569), Brookes (1979: 32-35) notes that one of the projectile point/knife forms from this cluster, the Big Sandy hafted biface, primarily functioned as a projectile point, although some were reworked into and used as end scrapers or gravers. Another projectile point/knife in the Big Sandy cluster, the Jude, may have been slightly later than Big Sandy points and seems to have developed into the Decatur projectile point/knife. The limited number of points, the evidence for resharpening, and the continual reuse of the points suggests that the Jude projectile point/knife had a specialized function. The Greenbrier hafted biface may also have been a specialized tool type because it was often reworked into gravers, end scrapers, and wedges. Although the evidence is limited, Plevna and Ecusta projectile point/knives may also be associated with the Big Sandy cluster.

The Big Sandy cluster is characterized by hafted bifaces that exhibit side notching, steep triangular blades, frequent blade edge serration, ground haft areas, and beveling through resharpening. There appears to be considerable overlap in the late Dalton hafted bifaces and the Big Sandy cluster; the overall Big Sandy tool kit is almost identical to the Dalton assemblage.

The Big Sandy settlement pattern consists of open sites and rock shelters. The overall population base may have increased during Big Sandy times based on the greater frequency of Big Sandy projectile point/knives over earlier forms (Walthall 1980: 49-52).

Kirk Horizon (7,500 B.C. - 6,500 B.C.)

The Kirk horizon, which seems to have developed from the preceeding Big Sandy complex, is marked by a distinctive projectile point/knife cluster (Ensor 1981: 169-171). During the earlier portion of the Kirk horizon, Kirk Corner Notched, Autauga, and Decatur forms may have predominated, while the latter portion of the Kirk horizon may have been characterized by Lost Lake, Pine Tree, Kirk Serrated, and Josselyn projectile point/knives. The Hester site (22MO569) has produced Kirk horizon hafted bifaces in good stratigraphic context above a Big Sandy component (Brookes 1979: 36-41). Kirk cluster projectile point/knives are medium, corner notched, hafted bifaces with deep serrations on the blade edges. Beveling, a typical trait, is the result of resharpening. Evidence from the Hester site suggests that Lost Lake, Pine Tree, and Decatur forms were used as projectile points; many hafted bifaces were used as knives. Variation in point morphology, such as the variation found in Decatur, may have resulted from continual resharpening of the blade edges. The overall appearance of the Kirk tool kit appears to be similar to the Dalton and Big Sandy complexes except that mullers and mortars are more commonly found in Kirk contexts than earlier complexes.

In the Tennessee Valley a wide range of bone and antler tools are associated with Kirk components (Walthall 1980:52-54). Bone and antler ornaments, bone fishhooks, awls, needles, and antler flakers and drifts are commonly found. Woven fabric has been reported (Chapman 1977: 107-112; Chapman and Adovasio 1977: 620-625) for Kirk components in eastern Tennessee. Subsistence data from the Tennessee Valley (Weigel, et al 1974) suggests that people during Kirk times hunted white-tailed deer, raccoon, squirrel, porcupine, skunk, bobcat, peccary, and turkey; and fished for drum, buffalo, and gar.

Bifurcate Horizon (6,500 B.C. - 5,800 B.C.)

The Bifurcate horizon, which may have developed out of the preceeding Kirk horizon, marks the end of the Early Archaic period and is characterized by the appearance of a cluster of small projectile point/knives with indented, bifurcated stems and serrated blade edges (Ensor 1981: 169). According to Brookes (1979: 56-57) northeastern Mississippi is on the fringe of the Bifurcate tradition, which represents a Mid-Atlantic phenomenon. This is supported by the nonlocal raw material of which the Bifurcate points are usually made. The early portion of the Bifurcate horizon in northeastern Mississippi may have been dominated by Le Croy projectile point/knives, while the latter part may have been characterized by a dominance of Beachum forms (Brookes 1979: 41). The tool kit consists of chisels or gouges,

utilized flakes, knives, a number of scraper forms, pitted cobbles or anvilstones, and hammerstones (Walthall 1980: 54-57).

The settlement pattern includes open sites with hearths and pits represented. Data is lacking on the fauna exploited during this time, but recovered floral remains include hickory nuts and acorns.

Middle Archaic Period (5,800 B.C. - 3,800 B.C.)

Eva Horizon (5,800 B.C. - 4,500 B.C.)

The Eva cluster (Ensor 1981: 168-196), is based on the Eva projectile point/knife which has a medium sized trangular blade and a short, basal notched stem. This style may have had its origins in the earlier Bifurcate tradition. If this is true, then the limited distribution of Eva forms in northeastern Mississippi may result from a more northern distribution of the Eva cluster horizon. The Eva projectile point/knife style may develop into the later Morrow Mountain-Sykes/White Springs cluster (Walthall 1980: 62).

The Eva complex is well documented at the Eva site (Lewis and Lewis 1961), where the Eva tool kit includes biface blades, drills, scrapers, choppers, anvilstones, hammerstones, and atlatl weights. A variety of bone artifacts was recovered from the Eva phase component: awls, needles, fishhooks, bitted tools, beads (turkey), perforated bear canines, and beaver incisor tools. Antler artifacts include narrow and wide scrapers, projectile point/knives, fishhooks, handles, perforators, flakers, and drifts. Red and yellow ochre were found in the Eva component. Burials were typically flexed and in rounded graves.

Mammal remians found at the Eva site include white-tailed deer, bear, raccoon, opossum, beaver, rabbit, muskrat, wildcat, otter, and squirrel. Other animals include turkey, turtle, drum, gar, and catfish (Lewis and Lewis 1961).

Morrow Mountain-Sykes/White Springs Horizon (4,500 B.C. - 3,800 B.C.)

The Morrow Mountain-Sykes/White Springs horizon, developing out of the earlier Eva horizon, is characterized by small to medium sized, triangular blades with short tapered stems. In addition to Morrow Mountain and White Springs projectile point/knives, Vaughn, Denton, Sykes, Opossum Bayou, and Crawford Creek hafted bifaces are associated with this horizon. The Vaughn form seems

to grade into the Elora style. Many of these projectile point/knives represent Coastal Plain varieties of a widespread Middle Archaic hafted biface horizon (Ensor 1981: 165-168).

The artifact assemblage includes a variety of uniface and biface stone tools such as end and side scrapers, flake knives, drills, biface blades, and spokeshaves. Other stones tools include pitted cobbles, manos, mortars, cores, hammerstones, atlatl weights, and pieces esquilles. Bone flakers, awls, and atlatl hooks, antler flakers and chisels, and turtle shell rattles have been recovered in Morrow Mountain-Sykes/White Springs contexts. Burials are flexed to partially flexed in circular graves or rock lined pits with caches of lithic and bone grave goods. Dog inhumations often are associated with Morrow Mountain-Sykes/White Springs occupations. The settlement pattern includes occupation of rock shelters and caves and open sites in floodplains, second terraces, and hills (Cridlebaugh 1977; Walthall 1980: 58-67).

Late Archaic Period (3,800 B.C. - 1,000 B.C.)

Benton Horizon (3,800 B.C. - 3,400 B.C.)

The Benton cluster (Ensor 1981: 164-165), which seems to have developed from the earlier Morrow Mountain-Sykes/White Springs projectile point/knife cluster, is based on the Benton projectile point/knife. This form has a short, broad, and straight-sided haft element and a wide excurvate blade. Based on materials from the Mann site (22TS565) (Peterson 1980) and the Moores Creek site (22AL521) (Weinstein 1981), the artifact assemblage may include a variety of bifacial and unifacial tools, including knives, drills, scrapers, gravers, and cores. Ground stone tools include hammerstones, manos, and atlatl weights. Blade caches and fired clay habitation floors, similar to those found in Pickwick Landing Reservoir (Webb and Dejarnette 1942; Dye 1980: 208-210) have been excavated. Amorphous, bell-shaped, and circular pits have been found associated with Benton components, in addition to subrectangular (6 m x 10 m) and oval structures. Some projectile point/knives, such as Sykes and Opossum Bayou may continue into Benton times. In fact, it appears that the Sykes/White Springs - Benton Horizon separations may not be as clear-cut as depicted here and elsewhere in the literature. The placement of Benton in the Late or Middle Archaic Period has not been consistent; however, for consistency in this report, it is placed in the Late Archaic as the initial horizon within the period. The Upper Tombigbee seems to have been on the southern edge of the Benton cultural horizon.

Pickwick Horizon (3,400 B.C. - 2,500 B.C.)

In several Upper Tombigbee Valley Archaic sites, there appears to be a chronological gap between the Benton horizon and the later Little Bear Creek time line. Although good stratigraphic context is lacking for the creation of a new cultural horizon, existing radiocarbon determinations and projectile point sequences, particularly in the Tennessee Valley, may justify a tentative horizon characterized by Pickwick projectile point/knives. These hafted bifaces are large to medium points with expanded shoulders, recurvate blade edges, and tapered stems (Cambron and Hulse 1975: 103). They appear to be morphologically between the earlier Benton forms and the later Little Bear Creek cluster.

Little Bear Creek Horizon (2,500 B.C. - 1,000 B.C.)

The Little Bear Creek cluster (Ensor 1981: 160-164) includes Little Bear Creek, Gary, and Mulberry Creek projectile point/knives. McIntire and Flint Creek hafted bifaces may belong to this group. These points exhibit long to medium blades, contracting haft elements, and horizontal shoulders. Floral and faunal remains from the Walker site (40HR212) (Dye 1980: 221-224), a Little Bear Creek site in the western Middle Tennessee Valley, indicate a diet based on white-tailed deer, beaver, rabbit, raccoon, soft-shelled turtle, freshwater drum, catfish, weed seeds, acorn, walnut, and hickory nut.

GULF FORMATIONAL S[illegible] (1,000 B.C. - 200 B.C.)

Middle Gulf Formational Period (1,000 B.C. - 600 B.C.)

Wheeler Horizon (1,000 B.C. - 600 B.C.)

The Wheeler culture is found throughout the western portion of the Southeast, but the majority of the sites are located in the Upper and Central Tombigbee Valleys, where the local phase is called the Broken Pumpkin Creek phase (Jenkins 1974, 1975; Walthall and Jenkins 1976), and in the western Middle Tennessee Valley in the Bluff Creek phase (Jenkins 1974,1975). Wheeler ceramics are found throughout the Central and Upper Tombigbee Valleys, but the frequency of sites increases in the northern portion.

Wheeler ceramics, the critical marker for the Broken Pumpkin Creek phase, are characterized by fiber tempering and simple bowls. The types include Wheeler Plain and Wheeler Punctate between 1,000 B.C. and 800 B.C. and the addition of Wheeler

Simple Stamped and Wheeler Dentate Stamped between 800 B.C. and 600 B.C. (Walthall 1980: 89-91).

The projectile point types associated with Wheeler appear to include the Wade horizon (1,200 B.C. - 700 B.C.) cluster types and Flint Creek horizon (1,000 B.C. - 200 B.C.) cluster types. The Wade cluster (Ensor 1981: 159-160) is composed of Wade, Cotaco Creek, and Motley projectile point/knives and are characterized by broad blades and incurvate, horizontal shoulders. These forms overlap with some of the Flint Creek cluster hafted bifaces and show some similarities with earlier Pickwick cluster types. The Flint Creek cluster (Ensor 1981: 157-159) is characterized by medium size forms with excurvate blade edges, parallel to slightly expanding lateral haft element edges, and straight to incurvate and horizontal to tapered shoulders. These forms are often finely retouched and well-made. There is considerable overlap between Flint Creek cluster, Wade cluster, and Little Bear Creek cluster forms.

Utilitarian tools associated with the Wheeler culture include bifacially chipped stone tools, expanded base drills, and a variety of bone and antler implements. Recovered ornaments include ground stone and expanded center, perforated bar gorgets (Benthall 1965: 43-46; DeJarnette, Walthall, and Wimberly 1975b; Walthall 1980: 90).

Walthall (1980: 89-91) hypothesizes that the Wheeler settlement pattern was divided between floodplain utilization in the warm months and upland hills occupancy in open sites in the cooler months. Subsistence remains, based on excavated material from the western Middle Tennessee Valley (Dye 1980: 228-231), would include white-tailed deer, rabbit, squirrel, and other small mammals, box and soft-shelled turtle, snakes, freshwater drum, catfish, hickory nut, weed seeds (including chenopod), grape, walnut, and acorn.

Wheeler groups occupying the Central and Upper Tombigbee Valleys participated in a widespread trade network or interaction sphere that included the Bayou La Batre culture to the south, the Bluff Creek phase to the north, the Poverty Point culture to the southwest, and other unnamed groups to the east and west. Evidence of trade with the Bayou La Batre is found in the recovery of stemmed projectile point/knives made from Tallahatta quartzite which occurs locally in the Bayou La Batre area, and in the recovery of small amounts of Bayou La Batre pottery. Trade with other Wheeler groups to the north or with similar populations to the east is demonstrated in the occurrence of steatite and sandstone vessels. The nearest source of steatite is the Alabama piedmont. Although trade is one means by which these artifacts may have found their way into local Wheeler phases, other possible mechanisms include direct acquistion from the source or

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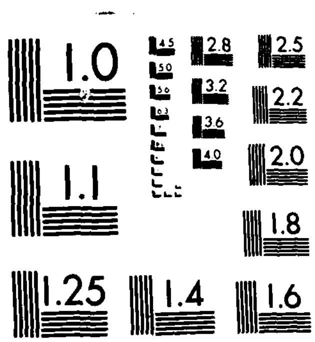

MICROCOPY RESOLUTION TEST CHART
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occupancy of the area for brief times by groups other than the Wheeler culture.

Late Gulf Formational Period (600 B.C. - 200 B.C.)

Alexander Horizon (600 B.C. - 200 B.C.)

The Alexander culture is located in the western Middle Tennessee Valley and the headwaters of the Tombigbee River. In the Tennessee Valley the local expression of Alexander is called the Hardin phase (Dye 1973), and in the Upper and Central Tombigbee Valleys the local Alexander culture is known as the Henson Springs phase (Jenkins 1979: 254-255; Walthall 1980: 100-102). As is the case with the Wheeler culture, the phase differences between the watersheds probably are the result of analytical grouping rather than real cultural divisions.

The separation of Alexander from the earlier Wheeler horizon is based on a wide range of complex, ceramic design motifs. In addition to a shift from fiber tempering to sand tempering and a change from simple bowls to globular and vertical sided, flat-based beakers or cups, there was a shift from simple and dentate stamping to incising, zone stamping, and an elaboration of punctating. The Alexander ceramic attributes are similar to other Gulf ceramic complexes at this time such as Tchefuncte, Orange, and Bayou La Batre, in addition to the earlier Wheeler horizon. The ceramic types include O'Neal Plain, Alexander Incised, Alexander Pinched, Columbus Punctated, Crump Punctated, and Smithsonian Zone Stamped. The incised wares show a great deal of variation and include rectilinear incised lines consisting of chevrons; chevrons filled with triangles; diamonds formed by cross-hatching, hexagons, and parallel lines; and curvilinear designs in conjunction with rectilinear patterns and stamping or punctating (Jenkins 1979: 255). Vessels commonly have podal supports, annular notched bases, and a variety of rim treatments which may include fabric impressing, incising, punctating, notching, stamping, and nodes.

The Flint Creek (1,000 B.C. - 200 B.C.) projectile point/knife cluster (Ensor 1981: 157-159) is associated with the Alexander ceramic horizon, representing a continuation of Little Bear Creek cluster and Flint Creek cluster hafted bifaces from previous periods or horizons. Specific information on other tool types is lacking, but the utilitarian lithic and bone tools probably represent a continuation of the Late Archaic and Wheeler forms and associated activities.

The settlement pattern suggests a continuation of the Wheeler pattern. In the Henson Springs phase area, Alexander sites have

been recorded from the floodplain, upland open sites, and bluff shelters (DeJarnette, Walthall, and Wimberly 1975a). Subsistence evidence is meager, but the presence of freshwater drum, hickory nut, walnut, acorn, grape, persimmon, and weed seeds (Dye 1980: 232-234) suggests the continuation of previous subsistence pursuits.

Active participation in the regional interaction sphere is evident if ceramics may be used as an indication of exchange networks. Alexander ceramics have been recovered from the Bayou La Batre culture in the Mobile Bay area, the Tchefuncte culture in the Lake Ponchatrain area, the Lake Cormorant culture in northwestern Mississippi, and along the Gulf Coast in northwestern Florida (Dye 1973; Walthall 1980: 102).

WOODLAND STAGE (200 B.C. - A.D. 1100)

Middle Woodland Period (200 B.C. - A.D. 600)

Miller I Phase (200 B.C. - A.D. 300)

In the Central and Upper Tombigbee Valleys, the Miller I phase of the Miller Culture (Jenkins 1979, 1981; Jennings 1941, 1944; Walthall 1980: 151-153) has been divided by Jenkins (1981: 257-259) into three subphases based on ceramic attributes.

The early Miller I subphase (Bynum) is represented at Site 22LE53 (Jennings 1941: 205) and Mound D at the Bynum site (22CS503) (Cotter and Corbett 1951: 24). This subphase may begin around 200 B.C. and continue until A.D. 1. The diagnostic ceramics are Baldwin Plain and Saltillo Fabric Marked. The vessels are sand tempered, globular jars with rounded or conoidal bases. At Bynum Mound D, mortuary ceremonialism was represented by cremations associated with a polished stone celt, a rolled copper bead, a double cymbal-type spool, and a Baldwin Plain vessel. An adult flexed burial was found in the village area of 22LE53.

The middle Miller I subphase (Pharr) dates from A.D. 1 to A.D. 200 and marks the beginning of the Miller culture's active participation in the Hopewellian Interaction Sphere. In addition to the earlier ceramic types, Baldwin Plain and Saltillo Fabric Marked, Furrs Cord Marked now becomes a minority type that increases through time as Saltillo Fabric Marked decreases. Mound Field Net Impressed also becomes a minority ware at this time. Excavated components include the Pharr Mounds (22PS500) (Bohannon 1972), Mounds A and B at Bynum (Cotter and Corbett 1951), and the Cofferdam site (22LO599) (Blakeman, Atkinson, and Berry 1976).

A wide variety of Hopewellian Interaction Sphere trade goods were included as mortuary offerings with middle Miller I subphase inhumations. Synder's projectile points from the Illinois Valley and copper, in the form of rolled beads, double cymbal-type spools, and coverings for unidentified wooden artifacts from Upper Michigan and eastern Wisconsin, were found. Silver, which was used to cover pan pipes, may also have come from Upper Michigan and eastern Wisconsin, and Galena fragments may have come from Missouri or Illinois. Marine shell artifacts from the Gulf or Atlantic Coasts have been found in addition to greenstone celts and platform pipes from the southern Appalachians. Lamellar blades struck from prepared cores of Flint Ridge chalcedony from Ohio were interred with middle Miller I subphase inhumations. An unidentified flint, which may be Elkhorn flint from Kentucky, was also recovered. Local materials may include a clay platform pipe and sandstone celts.

Ceramics associated with the middle Miller I subphase interments include Flint River Brushed and Flint River Cord Marked vessels from the Middle Tennessee Valley, and locally manufactured Furrs Cord Marked, Baldwin Plain, Saltillo Fabric Marked, and Alligator Bayou Stamped vessels. Ceramics from village areas include Mulberry Creek Plain and Flint River Cord Marked from the Middle Tennessee Valley.

The late Miller I subphase (Craig's Landing) continues the Miller tradition from A.D. 200 to A.D. 300. Alligator Bayou Stamped is added, as a minority type, to the existing ceramic suite of Baldwin Plain, Furrs Cord Marked, and Saltillo Fabric Marked. This subphase is represented by the Craig's Landing site (1GR2) (Nielsen and Jenkins 1973: 54-88; Jenkins 1975: 56-158), where trade is represented in the general village deposits by Marksville Incised and Marksville Stamped from the Lower Mississippi Valley; Mulberry Creek Plain, Flint River Brushed, and Flint River Cord Marked from the Middle Tennessee Valley; and Basin Bayou Incised, Santa Rosa Stamped, and Santa Rosa Punctate from the Lower Tombigbee Valley.

Miller I artifacts, in addition to the ceramics, include utilized flakes, biface blades, scrapers, milling equipment, and the Lanceolate Spike cluster (Ensor 1981: 154-156) and Lanceolate Expanded Haft cluster (Ensor 1981: 152-154) projectile point/knives (Jenkins 1979: 175). The Lanceolate Spike cluster includes narrow, thick, lanceolate forms possessing predominately contracting, excurvate bases and include the types Bradley Spike and New Market. These hafted bifaces may have been used solely as projectile points. The Lanceolate Expanded Haft cluster is composed of expanded lateral haft element edges. These projectile point/knife types include Mud Creek, Swan Lake, and Bakers Creek. These are generally made from locally available yellow jasper (Jenkins 1979: 175). During late Miller I shell

artifacts, probably manufactured from the marine gastropod Lightning Whelk (Busycon contrarium) include cylindrical beads that have been cut, drilled, and ground (Curren 1979).

The small Miller I villages or camps usually are scattered throughout the inner Coastal Plain, especially in the Black Prairie Belt and on the adjoining ridges and hills in western Tennessee, northern Mississippi, and western Alabama in the Mississippi and Tombigbee drainages. Many of the Miller I sites were established on earlier Wheeler and Alexander middens. This association led Jennings (1941: 207) to include Wheeler and Alexander ceramics in his definition of Miller. Mound centers or clusters are located near villages on small creeks. The Bynum site, a 2.8 ha Miller I village associated with six mounds, was partially excavated revealing nine houses ranging between 17 and 18.5 m in diameter that were associated with flexed burials, fire pits, and shallow storage or trash pits. The structures and features probably were associated with the middle Miller I subphase.

The Miller I subsistence pattern probably represents a continuation of Archaic and Gulf Formational Stage hunting, fishing, and gathering adaptation. Early Miller I sites have yielded remains of white-tailed deer as the predominate item, with minor amounts of small mammal, turtle, bird, fish, and mussels (Woodrick 1979: 153). Plant remains associated with early Miller I include hickory nut, acorn and grass seed (Caddell 1979: 55). Middle Miller I plants include hickory nut, acorn, and persimmon (Caddell 1979: 55). White-tailed deer and turtle are the predominate animal species in late Miller I components (Woodrick 1979: 153), while hickory nut, acorn, and a wild bean seed are the known plant species from this component (Caddell 1979: 55).

Miller I mortuary customs, particularly during the middle Miller I subphase at the Bynum and Pharr sites, include excavated and prepared depositories to receive the cremation or extended or flexed inhumation. Charnel houses were constructed over these excavated pits and small logs were then placed around the grave. After the charnel house or hut was burned, mortuary offerings were placed with the body and a mound was then built over the grave.

Miller II Phase (A.D. 300 - A.D. 600)

In the Central and Upper Tombigbee Valleys, the Miller II phase of the Miller Culture (Jenkins 1979, 1981; Jennings 1941, 1944; Walthall 1980: 153-154) has been divided by Jenkins (1981: 259-263) into two subphases based on ceramic attributes.

The early Miller II subphase (Tupelo) is represented at the Miller site (Jennings 1941: 190-192). This subphase begins around A.D. 300 and continues until A.D. 450. Early Miller II, a continuation of the Miller I phase in material culture and mortuary ceremonialism, begins when both Baldwin Plain and Saltillo Fabric Marked decline in favor of Furrs Cord Marked. As Baldwin Plain declines it is followed by an increase in Furrs Cord Marked. Baldwin Plain and Saltillo Fabric Marked continue as minority types.

An excavated example of this subphase is the Miller site (22LE62), excavated by Jennings (1941: 190-192). The site is located on Yonaba Creek in the Tombigbee headwaters. Most of the burials found at the site were extended, but some were flexed. There were no cremations. Grave goods were rare, but a marine gastropod shell cup and a limestone platform pipe, copper covered, wooden ear spools, and a locally made, but untyped vessel were found. In addition to the Miller ceramics, fragments of Mulberry Creek Plain and Flint River Brushed vessels were recovered. These wares may represent trade with contemporary groups in the Middle Tennessee Valley. The population of the region may have been increasing, based on the increased number of Miller II sites over earlier Miller I occupations.

Early Miller II structures recovered at the Miller site are either oval or elliptical (4.5 m x 5.4 m) or subrectangular (5.8 m x 6.4 m). Storage or refuse pits were often found within the structure. One flexed burial was recovered from inside one of the structures. Numerous shallow pits were encountered in the site midden. Subsistence evidence for early Miller II includes hickory nut, acorn, and walnut (Caddell 1979: 56).

The late Miller II subphase (Turkey Paw) begins around A.D. 450 and ends near A.D. 600. The diagnostic features of this subphase are based on changes in ceramic frequencies: Furrs Cord Marked becomes a minority type; Saltillo Fabric Marked virtually disappears; and Baytown Plain, Mulberry Creek Cord Marked, Withers Fabric Marked, Wheeler Check Stamped, Yates Net Impressed, Gainesville Complicated Stamped, and Soloman Brushed appear as a consistent part of the ceramic complex and increase in frequency through time. The predominant surface finish, in both sand and grog tempered wares, is a plain type. Large loop handles appear on ceramic vessels during this subphase.

Dietary evidence for late Miller II folk is represented by white-tail deer, which predominates in the faunal samples, and small mammals, including rabbit, squirrel, raccoon, opossum, beaver, dog, gray fox, and striped skunk. Large mammals such as black bear and mountain lion are minority elements in the sample. Turtles, birds, particularly turkey, fish, and mussels were also found (Woodrick 1979: 154). The plant remains include hickory

nut, acorn, walnut, grape, palmetto, pigweed, pine, persimmon, goosefoot, wood sorrel, dove weed, maygrass, partridge pea, sumac, pokeweed, honey locust, hawthorn, fescue, and a bulb from the lily family. Insect galls were also found. These plants suggest that clearing activities may have taken place near the sites. The late Miller II components contain larger numbers and an increased variety of seeds from herbaceous annuals over samples from earlier occupations and represents the heaviest reliance or greatest exploitation of walnuts and acorns (Caddell 1979).

During Miller II times the sites become more concentrated in the Black Prairie Belt (Jenkins, personal communication 1981). Burial mounds continue to be constructed and burials are no longer found in the village middens, but the absence of numerous trade or burial accompaniments indicates that the Miller II people are no longer actively participating in the Hopewellian Interaction Sphere. Excavated sites include 1GR1x1 (Nielsen and Moorehead 1972: 29-44), 1GR2 (Jenkins 1975: 56-158; Neilsen and Jenkins 1973: 54-88), and 1PI61. A late Miller II structure, measuring 8 m x 11 m in diameter, was excavated at Site 1GR1x1. A central oven, 1.5 m in diameter, was associated with the structure.

The Miller II projectile point/knife forms are represented by the Middle Woodland Tapered Shoulder cluster (Ensor 1979: 149-152). These hafted bifaces are characterized by straight blades, and straight to contracting haft elements with tapered shoulders. The type artifact, Tombigbee Stemmed, possibly overlaps with the earlier Miller I types, Lanceolate Expanded Haft cluster and Lanceolate Spike cluster, and resembles certain Late Archaic forms in the Little Bear Creek and Flint Creek clusters. Bone tools found in late Miller II contexts include mammal bone awls and bones from the white-tailed deer drilled into game objects (Curren 1979).

Two non-local ceramic complexes appear as consistent associations with local Miller wares in the village middens and may represent trade with neighboring areas. Trade with the Middle Tennessee Valley is represented by Mulberry Creek Plain, Wright Check Stamped, and Pickwick Complicated Stamped. Trade with the Lower Tombigbee Valley may be demonstrated by the occurence of Swift Creek Complicated Stamped, McLeod Simple Stamped-Brushed, McLeod Check Stamped, Franklin Plain, Mound Field Net Marked, and Weeden Island Red. A local bone tempered ceramic complex, Turkey Paw, becomes popular: Turkey Paw Plain, Turkey Paw Fabric Marked, and Turkey Paw Cord Marked.

Late Woodland Period (A.D. 600 - A.D. 1100)

Miller III Phase (A.D. 600 - A.D. 1100)

Jenkins (1979: 263-271) has divided the Miller III phase (Walthall 1980: 154-155) into four subphases based on ceramic typology. This phase is marked by the introduction of clay as a dominant ceramic tempering agent and by the presence of a bow and arrow technology.

The early Miller III (Vienna) subphase (A.D. 600 - A.D. 900) is divided into two subdivisions. Early Miller IIIa (Early Vienna), dating between A.D. 600 and A.D. 700 and represented at Site 1PI61, is a direct development out of the late Miller II subphase. The frequency of grog tempered pottery increases in the types Baytown Plain and Mulberry Creek Cord Marked. Furrs Cord Marked and Mulberry Creek Cord Marked emerge as major ceramic varieties during this subphase and Alligator Incised becomes a consistent minority type. Early Miller IIIb (Late Vienna), dating between A.D. 700 and A.D. 900, is an outgrowth of the early Miller IIIa. Grog tempered ceramics predominate in the ceramic assemblage; sand tempered wares are a minority type. Baytown Plain is the dominate ceramic type, while Mulberry Creek Cord Marked and Withers Fabric Marked are minority types. New ceramic types at this time are Gainesville Simple Stamped, Evansville Punctate, and Avoyelles Punctate. Baldwin Plain and Furrs Cord Marked are found in slight amounts. Early Miller IIIb sites include 22CL527, 22CL528, 22LO654, 22MO553 (Blakeman 1975), and 22TS954 and 22TS956 (Lafferty and Solis 1981).

The early Miller III subphase projectile point types include the Late Woodland Mississippian Triangular cluster (Ensor 1979: 145-149). Although there is considerable overlap between the point styles in this cluster, Ensor (1979) suggests that the Pickens point is associated with the early Miller III subphase. This arrow point type has a small, excurvate blade and a straight base and marks the introduction of a bow and arrow technology. A microtool assemblage is established at this time. Small chert flakes are frequently used as knives and pebbles are often chipped into scrapers. Other lithic tools include flake perforators and drills.

Bone artifacts include mammal bone awls, white-tailed deer leg bone punch/flakers, beaver incisor chisels, drilled and scored black bear canine pendants, drilled white-tailed deer foot bone game objects, scored, cut and ground mammal bone bead blanks, and probable white-tailed deer antler hammers (Curren 1979).

Faunal remains consist of white-tailed deer and small mammals such as rabbit, opossum, gray fox, raccoon, beaver, and squirrel. Minority amounts of mountain lion, striped skunk, black bear, and

common mole remains were found. Fish, shellfish, and birds, particularly turkey, were recovered (Woodrick 1979: 154). Floral remains include hickory nut, acorn, black walnut, persimmon, maygrass, pigweed, goosefoot, fescue, grape, and corn. The recovery of corn marks its earliest substantiated occurrence in the Tombigbee Valley (Caddell 1979: 56-57).

The middle Miller III (Cofferdam) subphase (A.D. 900 - A.D. 1,100) is characterized by increases in Mulberry Creek Cord Marked, Baytown Plain, and Withers Fabric Marked ceramics (Jenkins 1979: 266-268). Minority wares include Gainesville Simple Stamped, Solomon Brushed, and Alligator Incised, which sometimes is incised on the surface of Mulberry Creek Cord Marked and Withers Fabric Marked vessels and on the inside of Mulberry Creek Cord Marked, Withers Fabric Marked, and Baytown Plain wares. A small amount of shell tempered pottery seems to be associated with the Cofferdam subphase.

The middle Miller III subphase projectile point technology is based on the Late Woodland-Mississippian Triangular cluster (Ensor 1979: 145-149), particularly the Hamilton and Madison types. The Hamilton arrow point has an incurvate base and incurvate to occasionally straight blade edges which have been finely pressure flaked. The Madison arrow point has straight blade edges and straight to slightly incurvate basal edges. There is considerable overlap between these forms and earlier arrow points such as Pickens.

Middle Miller III bone artifacts include mammal bone awls, white-tailed deer punch/flakers, and drilled canine pendants. Cut, drilled, and ground cylindrical shell beads are also found and generally manufactured from probable marine gastropods (Curren 1979). Sites containing middle Miller III components are 1GR1x1 (Nielsen and Moorehead 1972: 29-44), 1GR2 (Jenkins 1975: 56-158), and Cofferdam (22LO599) (Blakeman, Atkinson, and Berry 1976).

Faunal remains recovered from middle Miller III contexts include white-tailed deer, which is the predominant mammal, and small mammals such as squirrel, rabbit, raccoon, opossum, beaver, muskrat, dog, gray fox, striped skunk, and bobcat. Other animals include turtles, fish, and birds, particularly turkeys (Woodrick 1979: 155-156). A variety of floral remains have been recovered: hickory nut, acorn, walnut, lily family bulbs, goosefoot, pigweed, beggar-lice, maygrass, wild bean, fescue, panic grass, knotweed, hawthorn, sumac, maypop, blackberry, dewberry, grape, loblolly pine, persimmon, and corn. Insect galls are also reported (Caddell 1979: 56-57).

The late Miller III (Catfish Bend) subphase (A.D. 900 - A.D. 1,100) is a direct development out of the early and middle Miller III subphases (Jenkins 1979: 268-270). Jenkins (1979: 269) and

Peebles (1981: 120) believe that the middle Miller III subphase probably was contemporaneous with the late and terminal Miller III subphases as a result of part of the Miller III population developing toward a Mississippian lifestyle, while other groups retained the traditional Late Woodland lifestyle. During late Miller III times, Mulberry Creek Cord Marked is the predominant ceramic type, followed closely by Baytown Plain and Withers Fabric Marked. Minority wares include Alligator Incised and Gainesville Cob Marked. There is a noticeable lack of sand tempered pottery associated with late Miller III components. The Madison point is the most frequent arrow point and represents the Late Woodland-Mississippian Triangular cluster (Ensor 1979: 145-149). Sites associated with late Miller III include 1PI33 and 1PI61.

Catfish Bend subphase faunal artifacts represent a variety of types: mammal bone, antler, and turkey foot bone awls, bone fishhooks, drilled black bear canine pendants, mammal bone punch/flakers, and cooter turtle shell rattle/cups. Shell artifacts are represented by drilled and ground small freshwater and marine gastropod beads; drilled disk and cylindrilcal beads, probably from the columella of the marine gastropod Busycon contrarium; and drilled rectangular shell beads. Triangular and teardrop shaped drilled shell pendants, and drilled freshwater mussel shell hoes are also associated with late Miller III components. Burial accompaniments include necklaces, headbands, hair ornaments, bracelets, shell gorgets, clothing ornaments, and turtle shell cups or rattles (Curren 1979).

Late Miller III faunal remains include white-tailed deer, which predominate; black bear; and small mammals such as squirrel, raccoon, rabbit, beaver, opossum, dog, gray fox, and striped skunk. Other animals include turtle, fish, and birds, particularly turkeys (Woodrick 1979: 156). The floral remains from late Miller III contexts are comprised of the following: hickory nut, acorn, walnut, maygrass, bedstraw, goosefoot, grape, fescue, persimmon, knotweed, pigweed, and corn (Caddell 1979: 56-57).

Hill (1979: 252-253) notes that in terms of the health of the late Miller III population from the Gainesville Lake area, the highest frequencies of developmental, infectious, degenerative, and traumatic pathologies took place during the Catfish Bend subphase.

The terminal Miller III (Gainesville) subphase (A.D. 1000 - A.D. 1100) (Jenkins 1979: 270-271) indicates a slight ceramic change took place from the late Miller III subphase to the terminal Miller III subphase. Shell tempered pottery, although an extreme minority, was added to the late Miller III ceramic inventory by A.D. 1000. Plain pottery increased; there were equal frequencies of Baytown Plain and Mulberry Creek Cord Marked; and Withers

Fabric Marked decreased slightly at this time. The same grog tempered minorities that occurred during the Catfish Bend subphase continued into the Gainesville subphase and grog tempered vessel handles reappear, although they are smaller and more finely made than earlier ones. Madison arrow points from the Late Woodland-Mississippian Triangular cluster (Ensor 1979: 145-149) continue into the terminal Miller III subphase.

Small, semisubterranean, rectangular structures appear in this Late Woodland subphase. Burial position changed from a tightly flexed inhumation with no consistent orientation to semi-extented burials placed on the back or side with the head oriented to the east. Sexual dimorphism decreased during the transition from Late Woodland through Late Mississippian times and burial treatments indicate a change from egalitarian to non-egalitarian, and then a return back to egalitarian forms of interment. This may indicate changes in social status and social organization (Hill 1979: 252-253).

Although, white-tailed deer seems to have constituted the primary meat source throughout much of the Woodland period, and probably the earlier stages as well, the use of this animal declined through time. Beginning with the latter portion of the Middle Woodland period, deer exploitation gradually decreased while the exploitation of other mammals, fish, turtles, and shellfish increased, reaching a peak by the end of the Late Woodland period. Throughout the remainder of the Late Woodland period, the dependency upon other vertebrates and invertebrates continued to increase.

The frequency of corn suggests that it was never a major carbohydrate source in the Late Woodland diet. Although corn was present, it never formed a large portion of any of the Late Woodland samples; wild plant remains dominated all samples. In addition, the Miller III phase components contained larger numbers and an increased variety of seed from herbaceous annuals than samples from earlier times. The presence and variety of seeds from these haerbaceous annuals suggest that there may have been extensive clearing. These Late Woodland folk seem to have practiced a mixed subsistence strategy (Caddell 1979: 57-67).

MISSISSIPPIAN STAGE (A.D. 1100 - A.D. 1540)

Early Mississippian Period (A.D. 1100 - A.D. 1250)

Moundville I Phase (A.D. 1100 - A.D. 1250)

Moundville phase sites have been reported from the Central Tombigbee Valley (Jenkins 1979: 275-277) and the Middle Tennessee

Valley (Peebles 1978: 370). The Upper Tombigbee Valley will be included in the Moundville cultural sphere in this overview of Upper Tombigbee aboriginal culture history because of its close geographical position to both the Central Tombigbee and Middle Tennessee Valleys. Further research undoubtedly will correct this state of affairs and place the Upper Tombigbee in a more accurate prehistoric cultural affiliation during the Mississippian stage.

The Moundville I phase (A.D. 1100 - A.D. 1250) is characterized by Moundville Incised and Mississippi Plain as the predominate ceramic types. Mound Place Incised, Bell Plain, and Carthage Incised are the minority wares. The characteristic form is an ovoid, pedestalled bottle. When the Moundville ceramic cluster first appears, the ceramic tradition arrives as a developed complex (Jenkins 1979: 275-276; Steponaitis 1980: 174-186).

Mature Mississippian Period (A.D. 1250 - A.D. 1400)

Moundville II Phase (A.D. 1250 - A.D. 1400)

The Moundvile II phase (Jenkins 1979: 276; Steponaitis 1980: 186-200) is characterized by Moundville Incised, Carthage Incised, and Mound Place Incised. The ovoid pedestalled bottle is replaced by a bottle with a wider body and a low pedestal or slab base. Strap handles become the exclusive handle form and the number of handles present on globular jars increases from two to four. Notched applique rim strips or fillers appear for the first time on hemispherical bowls.

Late Mississippian Period (A.D. 1400 - A.D. 1540)

Moundville III Phase (A.D. 1400 - A.D. 1540)

The Moundville III phase (A.D. 1400 - A.D. 1540) (Jenkins 1979: 276-277; Steponaitis 1980: 200-218) is characterized by a dominance of Moundville Incised or Carthage Incised, while Mound Place Incised and Moundville Engraved continue to be manufactured. Bottles with pedestalled and slab bases virually disappear and bottles now are subglobular with a simple base. Two new vessel forms appear: a short necked bowl and a cylindrical or semi-cylindrical bowl with a single lug. Filleted rim bowls gain their greatest frequency at this time, as do fish and frog effigy jars. The number of handles which occurred on globular jars increased again during this phase. Handles become smaller and rectangular and are usually molded to the body rather than riveted.

During the Mississippian stage the predominant arrow point style is characterized by the Late Woodland-Mississippian Triangular cluster (Ensor 1979: 145-149), particularly the Madison type. A variety of shell artifacts were manufactured during this stage. These included small, ground, freshwater and marine gastropod beads; cut, drilled, and ground cylindrical shaped beads (probably marine); drilled pearls (probably freshwater mussels); small, drilled and ground, disk shaped pendants (probably marine gastropod); ground, marine gastropod dippers; and drilled and ground, marine gastropod amulets (Curren 1979). Bone artifacts from this stage consist of turkey and mammal bone awls, mountain lion bone amulets, mammal bone fishhooks, antler projectile points, beaver incisor chisels, and drilled black bear canine pendants (Curren 1979). Mississippian burial goods include amulets, awls, fishhooks, necklaces, bracelets, chisels, projectile points, pendants, and dippers.

Faunal remains associated with Mississippian sites in the Central Tombigbee valley include white-tailed deer, which predominate; small mammals; turtles; and fish (Woodrick 1979: 157). Woodrick (1979: 157) notes that by Mississippian times there are fewer white-tailed deer remains than at any other time in prehistory, continuing a decline through time, while other mammals, turtle, and fish increase. Floral remains recovered from Mississippian sites include corn, beans, pine, hickory nut, acorn, persimmon, loblolly pine, grape, maypop, chickweed, pigweed, goosefoot, and tuber fragments (Caddell 1979: 57-58). Caddell notes (1979: 60) that corn forms a higher percentage of food plant remains from Mississippian features, but hickory nuts are still prominent. In fact, although corn was a main, if not the main carbohydrate base of the diet, hickory nuts and acorns were still a part of the diet (Caddell 1979: 67).

The Upper Tombigbee Valley seems to have been sparsely occupied during the Mississippian stage, but this may be due to the sample size; Mississippian villages are known to exist outside the Tennessee-Tombigbee Waterway construction zone, but have not been investigated. Without doubt, the Upper Tombigbee Valley folk participated in, or were part of, the overall Mississippian stage and would share many of the traits typical of Mississippian communities throughout the Southeast. During the Mississippian stage in several areas of the Southeast, the Late Woodland groups evolved into a complex settlement system centered around ranked ceremonial centers. The size and location of villages and hamlets was regulated by the productivity of adjacent agricultural soils, while the size and location of ceremonial centers may have been dictated by administrative factors (Peebles 1978: 13). This complex system of social stratification, with its extensive and complex redistribution systems, suggests a ranked society on the chiefdom level of socio-cultural integration (Sheldon 1974: 92).

CHAPTER 3

ENVIRONMENTAL DESCRIPTIONS

SETTING

The study area lies within the canal and river corridor of the Tennessee-Tombigbee Waterway Project in It. amba and northern Monroe Counties, Mississippi. Its northern boundary is the U.S. Army Corps of Engineers Lock and Dam at Bay Springs on Mackeys Creek and the southern limits extend to the Aberdeen Lock and Dam on the Tombigbee River (Figure 1.1). The topography ranges from nearly level in the floodplains and terraces to steep in the adjoining uplands. Elevations range from 75 m above sea level in the Tombigbee River floodplain to 122 m and greater in the steep uplands. The floodplain commonly exceeds a width of 1.5 km, and it contains numerous meandering sloughs, abandoned river cutoffs, and streams entering from the uplands. The current Tombigbee River channel is generally located in the western part of the floodplain.

The dissected uplands bounding the floodplain have steep side slopes with narrow ridges and valleys. The deeply incised streams form a dendritic drainage pattern with a relatively low entrance angle into the Tombigbee floodplain.

Today this area has a warm, humid climate with abundant rainfall. The months of December, January, and February have average minimum temperatures near freezing. Rain occurs throughout the year and is usually heaviest during winter and spring and lightest during the fall season (Table 3.1).

GEOLOGY

The study area is located in the Tombigbee River Hills region of the Gulf Coastal Plain (Figure 3.1). The Tombigbee River Hills in the area of study are comprised of unconsolidated marine sediments of Upper Cretaceous age (Figure 3.2). The Eutaw and Tuscaloosa formations outcrop in the area and provide the parent material for the upland soils and alluvial deposits (Stephenson and Monroe 1940). The Tuscaloosa formation is characterized by irregularly bedded sand, clay, and gravel, while the Eutaw formation is generally comprised of cross-bedded glauconitic sand and clay. The soils and sediments of the Tombigbee Hills eroded and were redeposited on the Tombigbee River floodplain during Pleistocene and perhaps late Pliocene time (Stephenson and Monroe 1940). Current Holocene sediments in the active floodplain are heterogeneous and related to current erosion and deposition processess.

GEOMORPHOLOGY

Considerable geomorphological research in the Tombigbee Valley has been conducted since 1979. The major portion of the work has been done by Benham-Blair and Affiliates, Inc. under the direction of Guy R. Muto and Joel Gunn. This was a multidisciplinary investigation of the Late Quaternary environments and Early Man in the Upper Tombigbee Valley (Muto and Gunn 1980a). The data base and first approximations made by the Benham-Blair team have been used in the archaeological investigations reported here. A high level of information exchange has been maintained between our two investigations and mutual consultants have been used for consistency. The brief geomorphological summary presented below is primarily derived from Muto and Gunn (1980a) and the reader is referred to that report for further detailed information.

The Tombigbee Valley began forming during late Tertiary times (ca. 30 million years ago) after being uplifted due to eustatic rebound following the recession of the Cretaceous seas. Continued relative uplift during the Pliocene and Pleistocene has resulted in one Plio-Pleistocene terrace and four Pleistocene terraces. During the development of the valley terraces, the river channel has generally migrated to the west due to a dip in the underlying sediments.

During the Pleistocene epoch, depositional and erosional cycles occurred primarily in response to glaciation and interglacial stages. Erosion occurred during the later parts of interglacial stages as sea level fell and during glacial periods at low stands of sea level. Depositional cycles occurred during the recession of glaciers and sea levels were at high stands. This cycle has resulted in the development of successively lower river levels.

The pre-Holocene terraces today are usually well dissected. They are composed of mixed alluvial sands and gravels. Finer grained materials occur only locally and are associated with relict oxbows.

During the Holocene (the last 12,000 years), terrace formation has continued and two levels have been identified. The Early Holocene terrace is the highest (one to seven meters) and the Late Holocene terrace is the lowest. In the Upper Tombigbee Valley (north of Smithville, Mississippi) most of the Early Holocene terrace deposits have been eroded and reworked with only small amounts remaining today. The Late Holocene terrace deposits are present in the valley and are usually dominated by fan deposits from high gradient side streams.

Relationships of the Holocene terraces indicate that the Tombigbee River has not changed its general position significantly during the Holocene. The total floodplain area has

remained the same. Tributary valleys in the Upper Tombigbee Valley are usually long, narrow, and surrounded by steeply sloping uplands. Ground slopes in the floodplains are usually gentle and typically flat or concave.

The floodplain consists of the floodbasin and Holocene terraces. The geomorphic units of the floodbasin include channels, chute cutoffs, point bars, levees, splays, marshes, oxbows, and undifferentiated floodbasin areas. This channel complex and related over-bank areas are usually flooded every one to ten years. The Holocene terrace includes local fans, fan veneers, and colluvial units, all of which can also occur in the floodbasin. The Holocene terrace unit is a depositional surface which is flooded periodically and actually defines the limits of the geomorphic floodplain. The higher portions of the Holocene terrace are only effected by high-magnitude floods and are semi-relict surfaces.

In summary, the geomorphological picture of the Upper Tombigbee Valley consists of four Pleistocene terraces, two Holocene terraces, and an active floodbasin. The geomorphic features of the active floodplain are present as relic features on the terraces.

It is important to remember that our archaeological investigations are concentrated on the floodplain. In this region approximately 12,000 years ago, when the Upper Tombigbee Valley was first occupied, portions of the newly formed Holocene terrace were available land surfaces as well as the floodbasin.

PALEOSOLS

Within the Holocene terrace unit three paleosols have been identified based on the alluvial chronology and soils associated with dated archaeological materials. These soils are designated Early, Middle, and Late Holocene soils and have formed in overbank deposits. The Early and Middle Holocene soils have generally been eroded and buried. The Early Holocene soil began forming in the late Pleistocene and persisted until approximately 7,000 years ago. At that time it was either buried (below Columbus), eroded (above Columbus), or slightly eroded and overlain by fluvial sediments in which pedogenesis continued (between Columbus and Ryan's Well). The Middle Holocene soil started forming as early as 9,000 years ago and persisted until approximately 3,000 years ago. In some instances the Middle and Early Holocene soils form a bisequem, the lower element which is the degraded Early B horizon. The Late Holocene soil consists of modern (post 3,000 B.P.) deposits and is poorly drained and organically rich.

The archaeological investigations conducted in Upper Tombigbee Valley and reported here have encountered all these Holocene soils identified by Muto and Gunn. The consistent association of chronolgically sensitive archaeological material in the paleosols has reinforced and refined the original sequence.

FLORA

Climatic and geologic processes have combined to produce the floral and faunal patterns throughout the history of the study area. The late glacial and postglacial history of the south-central United States vegetation can be traced from data obtained from numerous locations south of the glacier's edge.

During the Pleistocene, a colder climate may be inferred from palynological evidence recovered at Nonconnah Creek, Tennessee (Delcourt _et al._ 1980). A sequence of samples representing 23,000 to 13,000 years B.P. shows spruce (_Picea_) dominating, with fir (_Abies_) and larch (_Larix_) present. Continuous representation of ironwood-hophornbeam (_Carpinus-Ostrya_), ash (_Fraxinus_), birch (_Betula_), beech (_Fagus grandifolia_), maple (_Acer_), cottonwood (_Populus_), willow (_Salix_), elm (_Ulmus_), Viburnam (_Viburnam_), and walnut (_Juglans_) pollen supports the hypothesis that the loess bluff lands east of the Mississippi River in Mississippi and Tennessee and the dissected terrain adjacent to north-south trending rivers throughout the southeastern United States served as refuge areas for deciduous tree species during the full glacial period. This interpretation is strengthened by the recovery of a "hull and nut of _Fagus grandifolia_, a samara of tulip poplar (_Liriodendron tulipifera_) and _Carya_ hulls" (Delcourt and Delcourt 1979:93).

As the climate ameliorated, cool, temperate, Mixed Mesophytic Forest species spread along the Appalachian Mountains and the Allegheny and Cumberland Plateaus. The earliest expansion of this deciduous forest began about 16,500 B.P. at Nonconnah Creek, Tennessee (P. Delcourt 1978), Anderson Pond, Tennessee (H. Delcourt 1978), and Bony Springs, Missouri (King 1973). By the early Holocene, it had probably progressed northward to a line from North Carolina to southeast Missouri and northeast Arkansas.

By about 5000 B.P. the warming, drying trend of the Hypsithermal had its maximum effects in the eastern United Stat[illegible] The mixed mesophytic species became restricted to eastern Kentucky and to high elevations in the Appalachian Mountains while the prairie spread as far east as southeastern Missouri and a xeric oak-hickory-ash forest was present in central Tennessee (Delcourt and Delcourt 1979). Whitehead's data from Columbus, Mississippi

(n.d.) suggest that the water level in the B.L. Bigbee oxbow was lower or that it dried out seasonally.

After 5000 B.P., southern pine species (Pinus palustris, P. taeda, P. echinata, P.elliottii, P. serotina) became abundant on the Coastal Plain due to increased dominance of the tropical maritime airmass from the Gulf of Mexico (Figure 3.3). At the southern end and west of the Appalachian Mountains, however, a mosaic of deciduous and coniferous forests became common and persists today. Near Columbus, for example, sweet gum (Liquidambar styraciflua) became more important after 1500 B.C., tupelo (Nyssa aquatica) and black gums (N. sylvatica) increased until 300 B.C., and pine increased continuously since 500 B.C. (Whitehead n.d.).

Hilgard (1860) called the study area the Northeast Prairie Region. The prevalent timber in antebellum times was shortleaf pine (P. echinata), blackjack oak (Querus marilandica), post oak (Q. stellata), and chestnut (Castanea dentata). The narrow bottom of Mackey's Creek and its gentle slopes possessed a forest of Spanish oak (Q. falcata), other oak species, and hickory (Carya), but lacked pine. East of the Tombigbee floodplain, Itawamba County's land surface is very broken with red-orange soil. South of Fulton there is an area of red loam which was covered by large post, Spanish, scarlet (Q. coccinea), occasional black (Q. velutina) and white oaks (Q. alba) with hickory and shortleaf pine.

The 3.2 km to 9.6 km wide second bottom, bordering the river on the east, begins just north of Smithville. This terrace is composed of a rather light soil underlain by yellow loam and sand or gravel. The vegetation was varied in 1860, but loblolly pine (P. taeda) and flowering dogwood (Cornus florida) were prominent throughout. Near Smithville those species were accompanied by blackjack, post, Spanish, and scarlet oaks; closer to the river, cypress (Taxodium distichum), tupelo gum, hackberry (Celtis spp.), shellbark hickory (Carya laciniosa), and ash were their associates (Hilgard 1860:257-258).

Lowe (1921:30) places the study area in the Tombigbee Hills Region (Figure 3.1) and describes it as follows.

> of high broken topography - the highest point being 800 feet (240 m) above sea level. This was originally a plateau lifted upon the flank of the great Appalachian fold, and sloping gently towards the south, but its surface is now much cut up by erosion into steep hills and ridges.... The soils of this region, as would be expected, are light sandy and infertile, except in stream bottoms. This region in topography and geology represents a transition from

> the old Appalachian uplift to the Coastal Plain; we would therefore expect to find a similar character in the flora of the region, and such is found to be the case.

The dominant trees of the hills and slopes were short-leaf and loblolly pines. Associated species included blackjack, post, Spanish, and white oaks on the lower slopes. The rock chestnut (Q. prinus) and black oaks, dogwood, and hickory were common on the uplands.

In the bottoms there were remnants of a "once good growth" (Lowe 1921:32) of white, water (Q. nigra), willow (Q. phellos), and basket oaks, sycamore (Platanus occidentalis), beech, river maple, black gum, sweet gum, and cypress. Associated species included hackberry, ash, redbud (Cercis canadensis), great-leaved magnolia (Magnolia macrophylla), silverbell (Halesia carolina), storax (Styrax sp.), paw-paw (Asimina triloba), and red birch. A number of the above species reach their southern limit of distribution in Mississippi here.

In a more recent study, Zary (1979) found several forest types intermingled within Itawamba County. The slopes are occupied by oak-hickory, oak-pine, and loblolly-shortleaf pine forests (Figure 3.3). The bottomlands of the Tombigbee River and Mackey's Creek are covered by a hardwood forest composed of tupelo and black gums, sweet gum, oak, and cypress. Common associates in this forest included willow, ash, elm, hackberry, maple, and cottonwood (P. deltoides). An *ash-elm-cottonwood* forest is intermingled with the above type. This association includes willow, sycamore, beech, and maple.

Flora near the four major archaeological sites excavated was studied in July 1980. Plant communities examined quantitatively included a steep oak-hickory slope near 22IT563 and a bottomland levee near 22IT590.

Plots of 100 m^2 were established in areas of homogeneous vegetation. Each tree greater than 0.1 m diameter at breast height (DBH) was recorded. Woody and herbaceous plants less than 0.1 m DBH were counted by taxon over the entire upland plot and on 30 m^2 at the eastern end of the levee plot. Formal plots were not established at 22IT539 or 22IT576 because the floodplain had been clearcut before the botanical survey was initiated. However, a listing of the remaining taxa was compiled for those sites.

Table 3.2 illustrates the woody species composition of the two plots. Oak, hickory, sweet gum, red maple, and dogwood are found in both communities. Gum, beech, elm, tulip poplar, ironwood, and hop-hornbeam appear only in the floodplain community whereas

alder (Alnus), hackberry, birch, sassafras (Sassafras albidum), and sumac (Rhus) are confined to the upland plot. The presence of species recognized as successional (i.e. red maple, elm, tulip poplar, hackberry, and birch) and the large percentage of trees less than 0.1 m DBH is indicative of communities 25-50 years into secondary succession. The large numbers of red maple and hop-hornbeam trees are probably the offspring of particularly well-adapted individuals or populations.

Although the first vegetation (one to ten years) developing in disturbed habitats may not be typical, later successional stages do resemble those which were present in the primary forest. Secondary climax forests are made up of the same species as the primary forest even though their composition and structure may differ. Consequently, studies of extant vegetation are very important when reconstructing prehistoric floral environments.

Based on regional palynological profiles, historical descriptions, and recent vegetation studies, it appears that the Early and Middle Archaic (circa 10,000-5,500 B.P.) environment shifted from a Mixed Mesophytic Forest of cool, temperate species (beech, birch, hemlock, and spruce) to a forest dominated by xeric species (oak, hickory, and ash) on the ridges and warm, temperate species (cypress and gums) in the lowlands. The Late Archaic and Gulf Formational (circa 5,500-2,100 B.P.) environment was not much different from today's: a forest in which mockernut (Carya tomentosa), bitternut (C. cordiformis), pignut (C. glabra), shagbark (C. ovata), and pale (C. pallida) hickories; white, post, scarlet, Spanish, black, and blackjack oaks; loblolly and shortleaf pines dominated (Thomas 1974:20).

Potential plant resources in the reconstructed forest are listed in Tables 3.3 and 3.4. Examination of these lists shows that there are twice as many useful genera in the floodplain communities.

FAUNA

The fauna of the Upper Tombigbee Valley consists of a wide range of large and small mammals, birds, waterfowl, reptiles, and amphibians. The large expanses of bottomland hardwoods with intermittent oxbow lakes and streams (Bense 1982b, Muto and Gunn 1980a, U.S. Army Corps of Engineers, Mobile District 1977, 1982) provide ample cover for a great variety of species. Deer population is estimated at one per 41 to 81 acres. Squirrel populations are high with an estimated 3 per acre. Rabbit and quail populations in the area are good, with the quail being restricted to the more open areas. Furbearers such as beaver, muskrat, raccoon, bobcat, and fox are also abundant mammals. Turkeys are

low in numbers in this region today, but would have been numerous in the past. The abundant oxbow lakes and sloughs together with hardwood timber stands make this area attractive to migrating waterfowl and resident wood duck populations. In addition, morning doves, red-tail hawks, great horned owls, turkey vultures, and blue and green herons are examples of the larger bird species of the area.

The ecosystem supports a wide variety of reptiles and amphibians. These include turtles, snakes, salamanders, lizards, and frogs, many species of which occur in high numbers. Fish present in the area include large populations of bass, bowfin, carp, catfish, gar, perch, shiners, and sunfish.

The present distribution and numbers of the wildlife in the Upper Tombigbee Valley has, of course, changed somewhat through time in relation to the dynamic post-Pleistocene environment. It is generally agreed that by ca. 10,000 B.P. most Pleistocene megafauna had become extinct and modern patterns were established. The changes in distribution of these species during the last 10,000 years appear to have been slight enough that a generalized projection from the present through most of the Holocene can be done with good confidence. Therefore the faunal patterns of today can be generally pictured as those of the last 10,000 years.

SUMMARY

The Upper Tombigbee Valley lies within the Tombigbee Hills region of the Gulf Coastal Plain. The hills are composed of unconsolidated sands and gravels of Cretaceous age. The valley itself in this region is generally steep sided with a wide floodplain.

The flora of the study area consists of mixed forests of oaks, hickories, magnolia, and pine. Hardwoods dominate the floodplains with pines present on the slopes and uplands. The fauna consists of a wide range of mammals, waterfowl and other birds, reptiles, and amphibians. Fish are abundant in the streams, sloughs, and lakes.

The seasonal weather is warm and humid with abundant rainfall. Rain occurs heaviest in winter and spring.

The area of investigation contains a wealth of natural resources for aboriginal populations practicing the hunting-gathering-fishing subsistence pattern. During the last 10,000 years the general configuration of these resources has been approximately stable.

Table 3.1. Temperature and Precipitation Data.

Month	Average Daily Temperature* °C	°F	Average Number of Growing Degree Day** Units	Average Precipitation cm	in
January	6.7	44.1	0	14.91	5.87
February	8.0	46.4	0	13.97	5.50
March	12.0	53.6	112	17.65	6.95
April	16.9	62.5	375	9.88	3.89
May	21.8	71.3	660	9.70	3.82
June	26.4	79.5	885	9.83	3.87
July	27.6	81.6	980	11.46	4.51
August	27.4	81.3	970	7.32	2.88
September	23.9	75.0	750	7.67	3.02
October	18.1	64.5	450	7.21	2.84
November	11.1	52.0	60	11.43	4.50
December	7.6	45.6	0	13.61	5.36
Year	17.3	63.1	5,242	134.61	53.01

Adapted from: Soil Survey Staff 1979, Table 1

*Recorded in the period 1931-1952 at Tupelo, Mississippi

**A growing degree day unit is an index of the amount of heat available for plant growth. It can be calculated by using the average daily temperature, subtracting the temperature below which growth is minimal for the principal crops in the area (50°F), and multiplying the remainder by the number of days in the month.

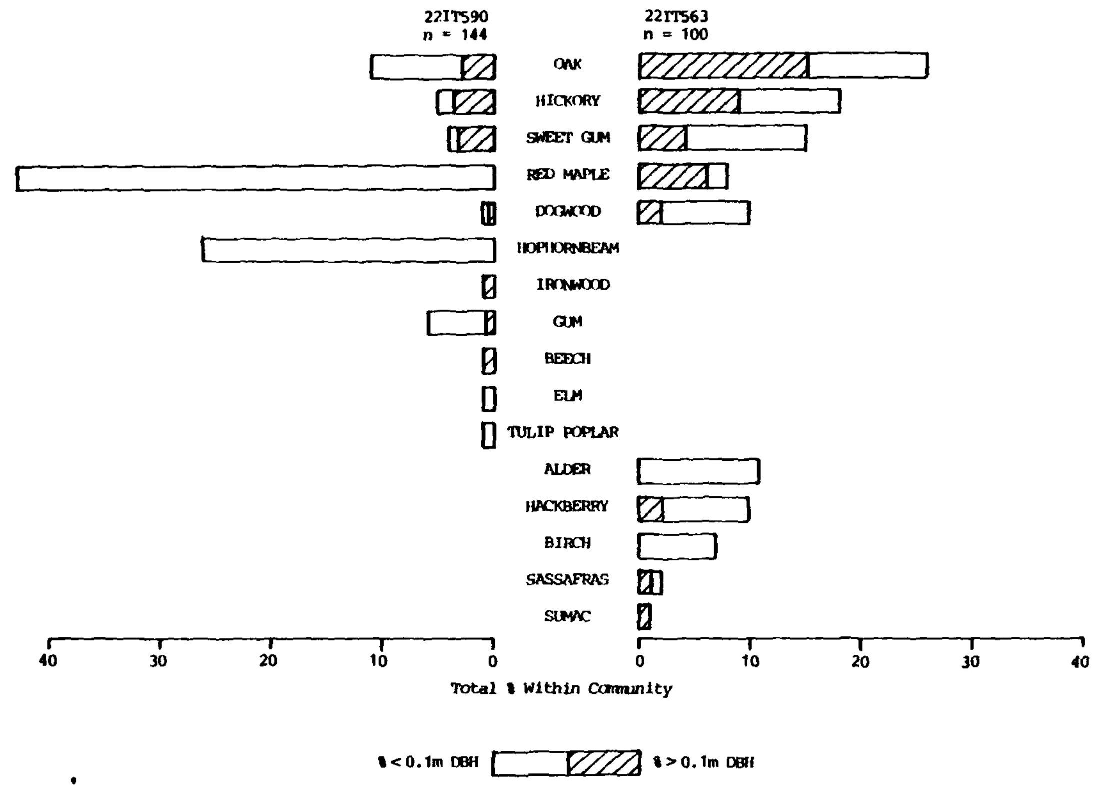


Table 3.2. Woody Species Composition of the Formal Vegetation Plots at 22IT590 and 22IT563

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASONAL AVAILABILITY
Acer negundo	Box elder	Sap	Sugar	
		Berry	Wax, sugar	May-October
Acer rubrum	Red maple	Sap	Beverage; syrup; sugar	
		Inner bark	Bread flour	
		Seeds	Cooked vegetable	April-July
Alnus serrulata	Tag alder	Roots	Dye	
		Bark	Wounds and ulcers	
Aralia spinosa	Devils walking stick			
Betula nigra	River birch	Sap	Sugar, syrup	
		Leaves	Tea	
		Bark	Tea, astringent, dye antiseptic, diuretic, diaphoretic, as flour	
Castanea dentata	Chestnut	Nuts	Roasted and eaten or ground into flour	September-October
Celtis laevigata	Hackberry	Fruit	Eaten raw or dried and ground into flour	August-October
Cornus florida	Flowering dogwood	Wood	Arrow shafts, split stems as toothbrush	
		Bark	Powdered is an effective substitute for quinine	
Hydrangea arborescens	Hydrangea	Root and rhizomes	Diuretics, cathartics, tonics	
Liquidambar styraciflua	Sweetgum	Gum	Antiseptic, expectorant, for skin infections, desharpener for	
		Leaves	tobacco for scabies, Chewed for sore throat, diarrhea	
Liriodendron tulipifera	Yellow poplar tulip tree	Bark	Gold dye	
		Root	As liquor; for lemon flavoring	

Table 3.3. Potential Plant Food Resources in Upland Forests

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASONAL AVAILABILITY
Pinus echinata P. taeda	Shortleaf pine Loblolly pine	Needles Cones	Tea Boiled; eaten	
Quercus alba Quercus coccinea Quercus falcata Quercus marilandica Quercus stellata Quercus velutina	White oak Scarlet oak Spanish oak Blackjack oak Post oak Black oak	Acorns	As nuts, flour, meal; boiled for oil	September-November
		Bark	For tanning; dye	
		Inner bark	Cut, dried, powered as infusion for dysentery and diarrhea, sore throat gargle, mild haemostatic	
		Wood	Split for basketry	
Sassafras albidum		Young leaves	Dried and powdered as a soup thickener; dye	
		Roots	As tea for tonic, for bronchitis, skin diseases, rheumatism, veneral disease, ague, poultice for wounds, eye wash	
		Flowers	Tea, dye	March-April
		Pith	Mucliage for ophthalmia	
Smilax sp.	Greenbrier	Young shoots	Cooked as vegetable	September-November
		Fruits	Masticatory.	
		Roots	Bread flour or meal; cooked as vegetable: meal mixed w/honey; tea	
Vitis baileyana V. rotundifolia V. vulpina	Possum grape Muscadine Frost grapes	Fruit	Edible, used in wine jam, jelly; for kidney functions and blood fortification	August-October
		Sap	As drink	
		Leaves	As potherb	

Table 3.3. Potential Plant Food Resources in Upland Forests

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASON OF AVAILABILITY
Acer negundo	Box elder	Sap	Sugar	
		Berry	Wax, sugar	May-October
Acer rubrum	Red maple	Sap	Beverage; syrup; sugar	
		Inner bark	Bread flour	
		Seeds	Cooked vegetable	April-July
Arundinaria gigantea	Cane	Shoots	Asparagus	
		Seeds	Wheat substitute	April-July
		Leaves	Webbing	
Betula nigra	River birch	Sap	For syrup, sugar, water	
		Young leaves, bark	As astringent, diuretic, diaphoretic	
Callicarpa americana	Beauty berry	Fruit	Nibble	August-October
Carya aquatica	Water hickory	Sap	For syrup, sugar	
Carya glabra	Pignut hickory	Bark	Dye	
Carya laciniosa	Shellbark hickory	Ashes	As decoction for indegestion	
Carya ovata	Shagbark hickory	Nuts	Eaten raw; boiled for oil; ground into meal	October
Celtis sp.	Hackberry	Fruit	Eaten raw or dried and ground into flour	August-October
Cephalanthus occidentalis	Buttonbush	Branch tips and inner bark of the root	To treat lung disease	
Dioscorea batatas	Cinnamon vine	Root	Dried, powdered for diarrhea, intestinal disorders, nausea	
Fagus grandifolia	American beech	Nuts	Eaten, ground into flour, boiled to extract oil	September-October

Table 3.4. Potential Plant Food Resources in Floodplain Forests

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASONAL AVAILABILITY
Parathenocissus quinquefolia	Virginia creeper	Fruit	Pink dye for skin paint	July-August
		Bark	Tonic; expectorant; for dropsy, diarrhea	
Platanus occidentalis	Sycamore	Sap	Boiled to produce pure water	
Populus deltoides	Cottonwood	Sap	Sugar	
		Young sprouts	Eaten	
		Bark	Eaten	
Quercus falcata Quercus spp.	Spanish oak Oaks	Acorns	As nuts, flour meal; boiled for oil	September-November
		Bark	For tanning, dye	
		Inner bark	Cut, dried, powdered as infusion for dysentery and diarrhea, sore throat gargle, mild hemostatic	
		Wood	Split for basketry	
Rhus copallina	Dwarf or winged sumac	Berries	Infused in beverage	August-October
		Leaves	As tobacco	
		Roots	Hemorrhoid cure	
		Bark	Tonic, astringent, antiseptic; decoction for gonorrhea, leucorrhea, diarrhea, dysentery, and hestic fever	
Salix nigra	Black willow	Inner bark	For severe colds and fever, chronic diarrhea (contains salicylic acid)	
		Leaves	Smoked	
Smilax sp.	Greenbriar	Fruit	Chewed as gum, jelly, cooling drink, dye	September-November
		Young shoot	Potherb, asparagus	
		Tubers	Ground into meal for bread; cooked eaten; aphrodisiac	

Table 3.4. Potential Plant Food Resources in Floodplain Forests

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASONAL AVAILABILITY
Fraxinus americana	White ash	Inner bark	As tonic, cathartic, diuretic	
		Buds	As tea for snakebite	
		Wood	Tools	
Ilex glabra	Inkberry Appalachian tea Gallberry	Leaves	Boiled for tea; boiled w/ *Gnaphalium obtusifolium* for colds	
Ilex opaca	American Holly	Flowers	Honey source	May-June
		Leaves	Tea (lacks caffeine)	
		Roots	Boiled with *Gnaphalium*	
Liquidambar styraciflua	Sweet gum	Resin	Expectorant; as an anti-septic, as chewing gum	
		Leaves	Chewed to relieve sore throat	
Liriodendron tulipifera	Tulip poplar	Bark	Gold dye	
Lobelia cardinalis	Cardinal flower	Leaves	Externally as a hot application for swelling; internally for asthmatic and bronchial dis-orders	
		Root	Tea for stomach trouble, worms, to reduce fever, nose bleed, rheumatism, headache, colds	
		Roots & Flowers	As love charm	July-October (flowers)
Morus rubra	Red mulberry	Fruit	Edible raw; tea for fever and laxative	May-June
		Inner bark	Tea for mild laxative	
		Outer bark sap	Worms; ringworm	
Nyssa aquatica *Nyssa sylvatica* var. *biflora*	Tupelo gum Black gum	Fruit	For preserves	August-October
		Branchlets	As toothbrushes	
		Bark	Tea for menstrual and child-birth problems; dye	

Table 3.4. Potential Plant Food Resources in Floodplain Forests

SPECIES	COMMON NAME	PLANT PART(S) USED	USES	SEASONAL AVAILABILITY
Taxodium distichum	Bald cypress Swamp cypress	Wood	Tools	
Ulmus alata	Winged elm	Wood	Mortars and pestles	
Vitis rotundifolia	*Muscadine*	*Fruit*	Eaten fresh, for preserves as beverage	August-October
Vitis vulpina	Frost Grape	Young leaves and stems	Cooked as greens	
Xyris ambigua	Yellow-eyed grass	not specified	Colds and pulmonary	

Table 3.4. Potential Plant Food Resources in Floodplain Forests

Figure 3.1

Physiographic regions of Mississippi

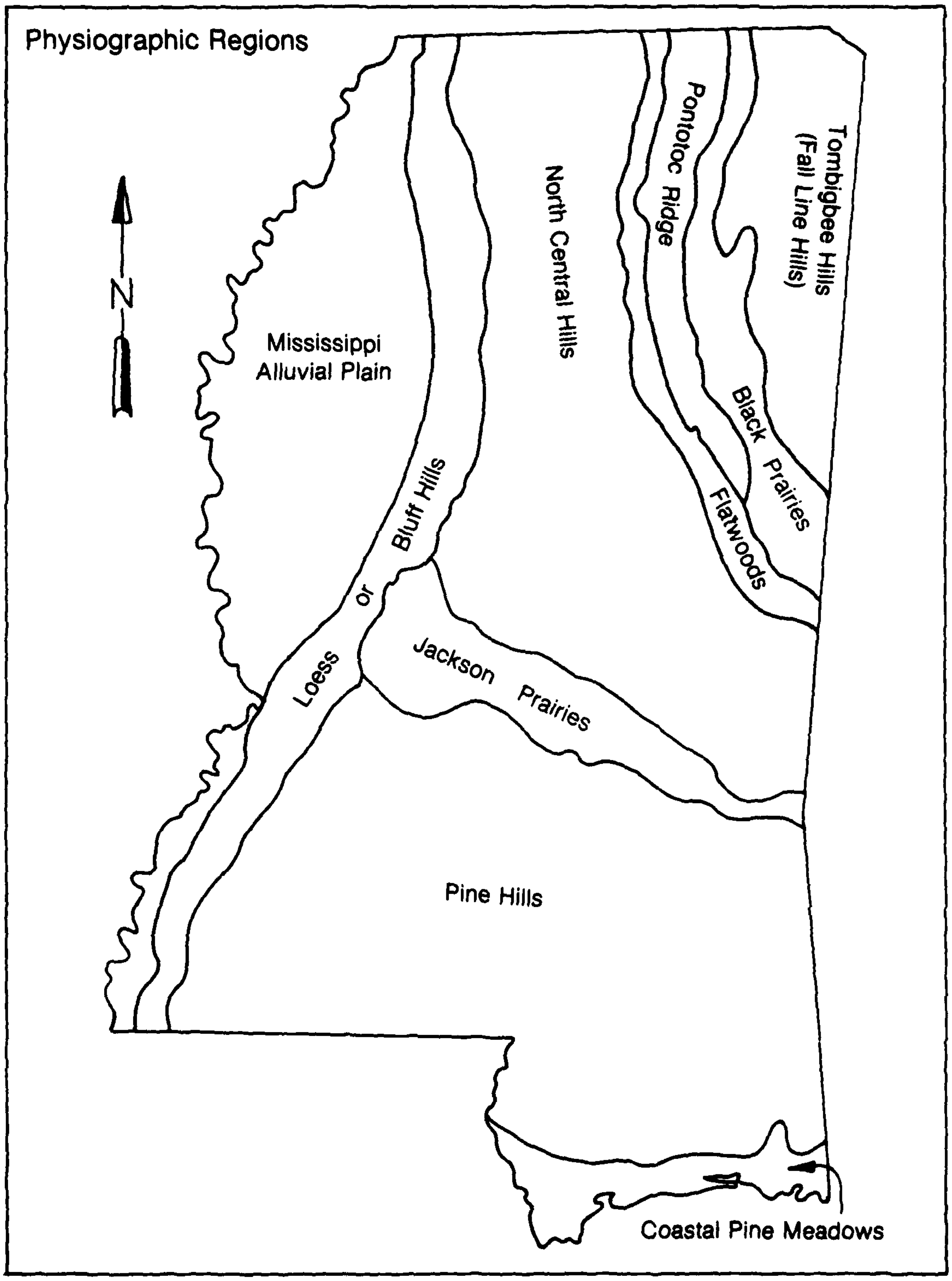
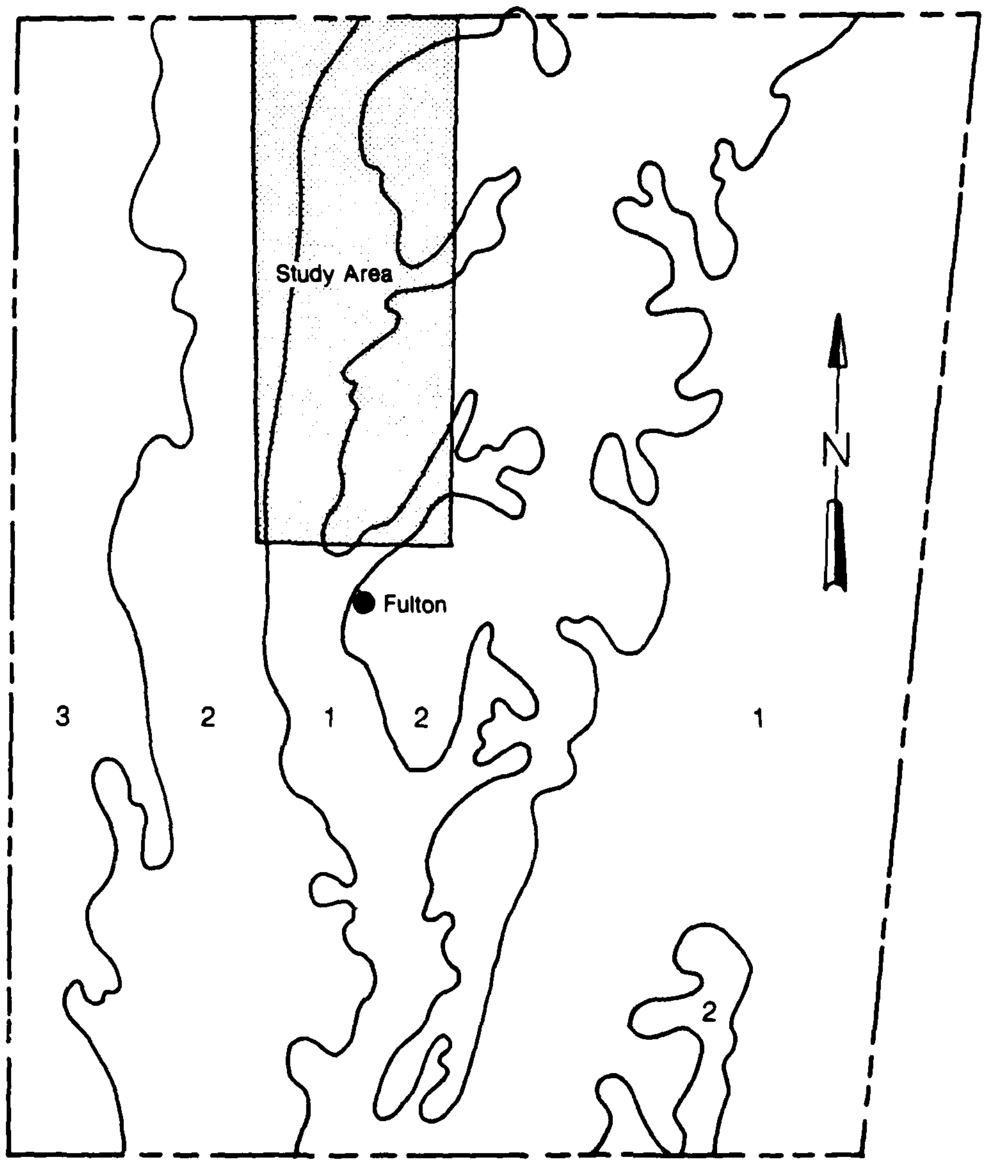

Physiographic Regions
N
Mississippi Alluvial Plain
Loess or Bluff Hills
North Central Hills
Pontotoc Ridge
Tombigbee Hills (Fall Line Hills)
Black Prairies
Flatwoods
Jackson Prairies
Pine Hills
Coastal Pine Meadows

Figure 3.2

Geologic formations in the Tombigbee River Hills



LEGEND

1 Tuscaloosa formation (irregularly bedded sand, clay and gravel).

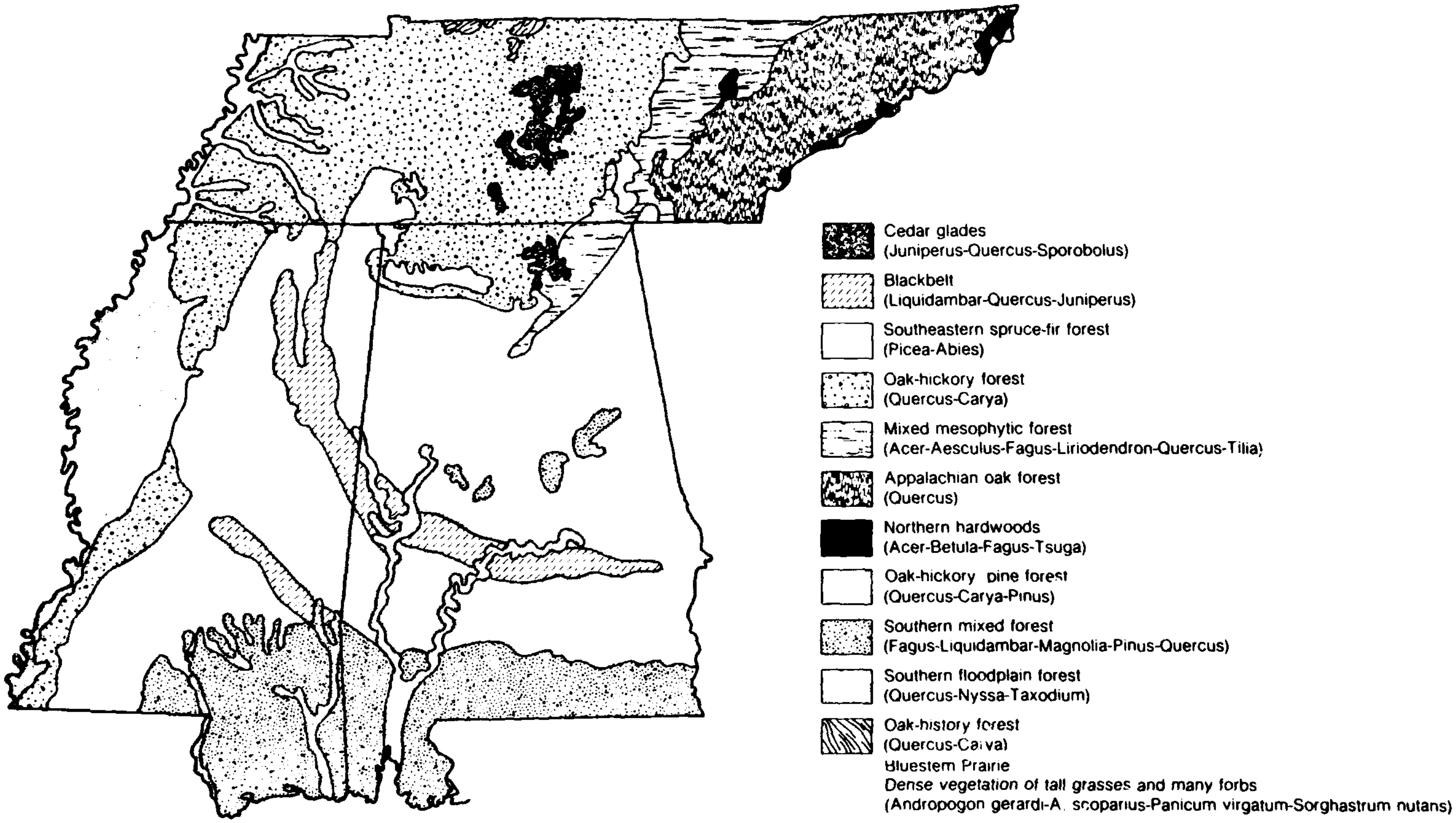
2 Eutaw formation (cross-bedded glauconitic sand and clay).

3 Tombigbee sand member of Eutaw formation (massive fine glauconitic sand).

Figure 3.3

Regional vegetation map
adapted from Kuchler (1974)

REGIONAL VEGETATION MAP



CHAPTER 4

DATA RECOVERY STRATEGY

INTRODUCTION

This chapter will present the strategy utilized to implement the research design of the project. The research design is attached to this report as Supplement I and contains an in depth explanation of the perspectives of anthropology and archaeology utilized in these investigations. A summary of this perspective has been presented in Chapter One of this report.

Implementation of a research design is in itself a difficult task. In the work reported on here, several additional factors which affected the strategy of the project had to be delt with. These factors included the following:

1. The nature of the multi-component sites dictated the need to know during data recovery the nature of the material and what components were being excavated. Therefore, a laboratory had to be established in the field headquarters to function simultaneously with the excavations.

2. The expected number of specimens to be processed in the laboratory was extremely large; therefore, the staff had to be large.

3. This expected data set was so large that a computerized data management system for storage, access, and organization had to be established in the field headquarters.

4. The scope of the research necessitated professional expertise beyond the project staff's combined professional experience. Therefore, a number of outside archaeologists and consultants in specialty fields had to be employed.

The reader is referred to the original Research Design (Supplement I) for the detailed explanation of these and other influential factors. It should be remembered that from the testing information it was known this would be an extremely large and complex project and that in such an endeavor the strategy forms the backbone of the effort.

The strategy of the project was designed in 1979 and was implemented over the course of 15 months of fieldwork which included two winter seasons and an additional five months of analysis and report preparation. During these 20 months, the strategy was modified as different situations and problems were encountered and as efficiency increased. However, the basic design remained intact. The project strategy presented in this report will be that which best reflects what took place. When necessary, the background will be presented. The original strategy is presented in the Research Design.

PRIMARY RESEARCH STRATEGY

The objectives for Phase I were threefold: to recover data in a controlled manner, to recover an adequate sample to address the research questions, and to understand the nature of the former occupations of the sites under investigation through data analysis. This was accomplished through a system containing three areas of activity (data recovery from the field, laboratory analysis of recovered materials, and data management) which were linked by a network of interaction. The information acquired was transferred within the project by formal staff meetings held at least weekly and between the staff and federal and university representatives through formal feedback meetings held at the completion of each third of the investigation at each site. Consultant interaction was formalized through evening seminars with the senior staff.

Each of the three components of the project system will be described in a separate section of this chapter. The following section will describe the principles and interaction of the components.

FIELD STRATEGY

The strategy of all fieldwork was to maximize data retrieval in a standardized manner to insure comparability, and at the same time to allow for the flexibility to incorporate individual site situations. The basic control processes were identical for all work, as were the forms used to record the information. The basic premise of the field operations was to provide useful information through a set of techniques tailored to the type of sites under investigation. As expected, through the course of 15 months of fieldwork, both methods and techniques evolved with ever-increasing efficiency. However, the basic control procedures remained essentially intact during Phase I.

Interaction between the field director , the laboratory director, and the data manager provided much information exchange. With the swift movement of data through the project components from the field to the lab to the computer, the field strategy could be evaluated quickly and kept consistent. The natural system of cross-checks in data flow eliminated errors at each level of exchange and movement. The level of interaction between the lab and field also influenced the fieldwork decisions. Field decisions were often made in coordination with the laboratory director, data manager, Principal Investigator, and bookkeeper. This integration of project personnel and information kept fieldwork as consistent as possible.

LABORATORY STRATEGY

The laboratory strategy during Phase I was originally designed to include both data classification and data management. However, early on in the project, it was realized that the data management demands were such that a separate system was needed to accomodate it. Therefore, the laboratory was oriented to artifact and paper record processing.

The twofold purpose of the artifact analysis was information feedback and collection organization. The schedule of the project required a rapid fieldwork pace. Hence, this pace was also necessary in the laboratory. The projected one-day turnaround time was not reached, but a high level of information was available concerning recovered material within a few days of check-in. Necessary information was ranked and fed back to the field staff for efficient decision making. Patterns and anomalies observed in the laboratory processing were relayed on an encounter basis.

In summary, the laboratory and field staffs worked closely together during Phase I. The constant exchange of field content and artifactual content information provided the mechanism for well-integrated investigations of these eleven sites.

DATA MANAGEMENT STRATEGY

The purpose of the data management system was to insure quality control of the information flow process, to store and maintain security of information, and to retrieve information. Hence, data management played an important role in decision making and project operation.

Due to the remote location of the field headquarters in Fulton, Mississippi (350 miles from campus) and the need for information in the field , a data processing center was established in the field headquarters. This center consisted of three terminals, and an auxillary printer connected to the Northeast Regional Data Center in Gainesville, Florida via a special telephone (trunk) line. This equipment allowed data processing operations to be performed in the field. These operations included input/ouput, programing and debugging, file manupulation, and report production. The high speed printer at the University of West Florida Computer Center was used to produce unusually lengthy reports.

Data management provided project-wide storage and security of information and produced reports for the senior staff. These reports included frequency distributions, graphs, correlations, and plots using primarily the SPSS and SAS software packages.

The data management system underwent the most change during Phase I. This is a relatively new and rapidly evolving aspect of archaeology. The problems encountered resulted from an under estimation of the data management needs for this project. The pace of data recovery and lab processing built up a large backlog of information prior to resolution of the problems. In spite of this situation, the data management staff managed to obtain its objectives and develop a system capable of operating at the necessary pace. In addition, the archaeologists learned to work with the procedures of computerized data.

SUMMARY

The strategy of this project was based on the structured interaction of the three system components: data recovery, laboratory analysis, and data management. The personnel management and information feedback structure which operated within this system was designed to implement the research design and deal with contract constraints. Throughout the 20 months of Phase I, the strategy was modified to meet individual contingencies of specific sites, weather, or problems. However, the basic design of an interactive tripartate system with high level feedback was maintained throughout the investigations.

FIELD PROCEDURES

INTRODUCTION

The field procedures employed during Phase I of data recovery are presented in detail in the Field Manual which is Appendix V of this report. What is presented here is a summary of the structure, recovery techniques, recording methods, laboratory interface, and special studies performed on this project.

Data recovery methods and techniques employed in Phase I fieldwork were designed to be compatible with the cultural resource management program of the greater Tombigbee River Multi-Resource District. During the planning period in the fall of 1979 preceeding actual Phase I fieldwork, excavation strategies and field recovery forms were developed and standardized to provide a minimum standard varying according to the unique character of each site examined in Phase I.

FIELD PERSONNEL STRUCTURE AND RESPONSIBILITIES

A nested, hierarchical system of work reponsibilities was instituted at the outset of the field operations and continued with much success throughout the duration of the project. Two field crews were each headed by a Field Director (one senior, and one junior). These people were responsible for development of overall site excavation and project-wide field strategies and for the preparation of the major site reports. Each field director was paired with an Assistant Field Director who was responsible for carrying out on a daily basis the strategies developed by the directors at each site, acting as a liaison between field and lab, and assisting the directors in decision-making and writing of the site reports. Directly responsible to the Assistants were several Team Leaders. These were mid-level supervisors responsible for a crew of two to six members. Team Leaders directed their team, kept the Director and Assistant Director informed of changes in the material being recovered, were responsible for field drawings and form completion, and excavation procedures. Excavators were responsible for completing the excavation task and paperwork assigned to them. This system provided numerous cross-checks and feedback on fieldwork procedures while excavations were being carried out.

FIELD RECOVERY TECHNIQUES

Site Location and Preparation

All eleven sites in the Phase I mitigation program had been previously located (cf Chapter 2). 22IT576, 22IT539, 22IT563, 22IT590, and 22MO531 were covered in a moderately dense secondary growth of hardwoods. Extensive clearing with chainsaws, axes, and brush hooks was necessary at these sites before excavation could begin. Light to moderate amounts of clearing had to be done at 22IT623, 22IT624, and 22IT621 which were also covered in secondary growth. 22IT622, 22IT606, and 22MO675 needed little clearing since these sites were in areas more thoroughly impacted by historic, Euro-American activity.

Once sufficient space had been cleared, a Cartesian grid was laid in at each site for horizontal control. An arbitrary 0-0 point was established to the northeast of each site and an arbitrary datum of 100S/100W was established. Previous testing data for 22IT539, 563, 576, and 590 (Bense 1982) was easily converted to this new grid system by adding 100 m to each testing unit coordinate. All units were thus designated by the northeast corner of the unit. Baseline and grid stakes were extended from the 100S/100W point to aid in topographic mapping and placement of cores and excavation units. Unless topographic or surface fea-

tures interfered, site grids were aligned with magnetic north. Vertical control was established by setting in one or more benchmarks at each site. If an actual AMSL elevation could not be immediately established, these benchmarks were given the arbitrary designation of Elevation 100 m for site excavation use and were later tied in with the U.S. Army Corps of Engineer's benchmarks when possible.

Mapping of Site Topography

A detailed topographic map was prepared for each site using either a transit or an alidade and plane table. As excavation or test units were opened, these were added to the topographic map, or if the topography was complex, a separate excavation plan map was made.

Surface Collections

The woodland nature of most of the Phase I sites usually precluded the need or value of a surface collection. Two sites, 22IT622 and 22MO675, both plowed sites, were collected by use of a random stratified sampling technique. A map of the site was first divided into 12 by 12 m units each containing nine numbered 4 by 4 m units. A table of random numbers was then used to select two units from each 12 by 12 m square for 100 percent, timed collection of artifacts. This process allowed for a 22.2 percent random sample of each site. A slightly different surface collection technique was used at 22IT606 to recover a 20 percent sample (cf Chapter 9).

Mechanical Excavations

At all of the sites except 22MO675 and 22IT606, trenches were cut by a backhoe to expose stratigraphic profiles. Ideally these were placed prior to or shortly after excavations had begun on the site. The trenches were cut to provide an assessment of site formational processes, to delimit site boundaries, and to aid in placement of excavation units. At 22MO675 a box-end scraper was used to mechanically strip select transects in a effort to determine if intact features were present. At 22IT606 a small, angled-blade bulldozer was used to remove the plow zone and inspect for features.

Visual and Chemical Coring

Cores were taken in a systematic fashion on two sites, 22IT539 and 22IT576. Coring was done to aid in excavation unit placement and to locate subsurface anomalies. An Oakfield 3/4 inch Tube Sampler with extensions was used to remove 20 cm plugs of earth vertically from surface to the base of the site at set intervals along the site grid. Visual cores were examined in the field for cultural content and the presence of soil anomalies. Detailed notes concerning soil type, texture, color, and compaction as well as cultural content were kept for each core segment taken. Chemical cores were similarly taken at another interval distance on these sites. These cores were recorded, bagged, and sent to the field lab to be tested for pH, phosphate, and calcium carbonate levels.

Excavation Unit Placement

At most Phase I sites excavation unit location was determined judgmentally rather than by a random sampling technique. Information gathered from previous research projects, surface collections, stratigraphic trenches, and coring were taken into consideration along with the unique topographic features of each site before the initial excavation units were located. At one site, 22MO675, a combination of randomly selected test units was complimented by a judgementally placed unit. Additional units at the larger sites were placed with all of the above-mentioned factors taken into account, as well as the cultural and site formational information retrieved from the initial unit excavations.

Excavation of Units

The standard excavation unit for Phase I sites was a 2 by 2 m unit removed by shovel in 10 cm levels. These units were placed individually or in groups (blocks) as desired. Where topographic needs or time contraints warranted, this basic unit was modified into a 1 by 2 m unit, a 1 by 1 m unit, or 50 by 50 cm squares. The vertical dimension was also at times modified into sub-level increments (Level 1-2, 1-3, etc.) of less than 10 cm to pick up subtle details. When possible natural stratigraphic levels were employed, but this was rare given the extremely dark color of most of the midden deposits.

Feature Excavation

An anomaly which persisted after definition by troweling was generally designated as a feature. Features were mapped and photographed prior to, during, and after excavation. Features other than burials were generally bisected and removed by trowel with each half being separately processed by water flotation. Burials were mapped and photographed, then carefully wrapped and moved to the field lab for special studies.

Special Samples

A variety of special samples were taken during the course of Phase I. These are discussed below.

An effort was made to plot the location and depth of all lithic tools and ceramics found in situ during the excavation of general units. These are referred to as plotted specimens.

A macrobotanical sample (2 or 4 liter standard) was taken from each level of each general unit. All such samples were processed by water flotation. Feature fill was generally treated as a macrobotanical sample.

Carbon 14 samples were taken whenever in situ charred botanical remains were recovered. These remains were removed immediately with a clean trowel, placed in clean aluminum foil, then placed in a plastic bag.

One or more 50 by 50 cm control blocks was located in each block of units. These control blocks were further sub-divided into four 25 by 25 by 10 cm increments. A four liter macrobotanical sample, a six liter perpetuity/soil sample, and a 25 by 25 by 10 cm finescreen sample were taken from three of the control block quadrants. Originally, the fourth quadrant was reserved for pollen, biosilicate, and lipid samples (one liter each). Later it was decided to remove these samples from the perpetuity/soil samples if desired, so this quadrant was reincorporated into the general unit level fill.

Six liter perpetuity/soil samples were generally taken from features and control blocks. These were stored for pollen, soil, biosilicate, and lipid studies at a future date.

Archaeomagnetic samples were taken for dating by Dr. Robert DuBois at 22IT539 and 22IT576. Additional samples were later taken at 22IT539 and 22IT590 by Phase I staff personnel who had been instructed by Dr. DuBois.

In addition to the special sampling procedures discussed above, special samples were taken any time it was felt an anomaly deserved further studies.

Waterscreen Processing

All fill from general 10 cm levels was processed through 0.25-inch hardware mesh at a waterscreening station (Figure 4.1). Finescreen samples from control blocks were passed through the 0.25-inch fraction and a 0.06-inch mesh as well. In addition, some features and select general units were subject to finescreen (0.06-inch) processing. After cleaning, all materials recovered were bagged by unit and level, special sample, or feature identification numbers to be sent to the field laboratory for analysis (cf Field Recording Techniques section).

Macrobotanical Processing

Macrobotanical samples were generally processed at an on-site flotation station. A water-agitation system was devised, to separate 0.25-inch, heavy fraction (0.06-inch) and light fraction (5-mm) materials from the soil matrix of the macrobotanical samples. Samples were processed, dried, bagged, and taken to the lab for sorting before select samples were sent to a botanical analyst.

FIELD RECORDING TECHNIQUES

Maps

The general site maps usually prepared included a detailed topographic map, a site excavation plan map, detailed drawings of all stratigraphic profiles and bottom of level maps for any blocks of multiple units. In addition, detailed maps of the base of each level in all units were made and attached to the appropriate field form. Pre- and post-excavation plan maps, as well as profile drawings were completed for features.

Photographs

The photographic record of each site was considered an integral part of the recording system and as such daily photographic records were made at each site in both black-and-white prints and

color slides. General site photographs recorded all steps from pre-clearing, through excavations, to post-excavation views of a given site. Features were thoroughly documented on film from pre- to post-excavation. General level floors which exhibited usual characteristics were photographed, as were all stratigraphic profiles and all block excavation units. Photographs were generally made by the site photographer or the field director or assistant field director. The site photographer was also responsible for keeping a daily site photography log, as well as processing film and preparing a permanent catalog and index of all site prints and slides.

Master Identification System

A nested system of Identification Numbers (ID's) was devised to record and control all materials recovered from each site. All ID numbers were recorded in a log at the time of assignment by the waterscreen team leader. Along with the ID number, information pertaining to unit coordinates, block location and/or feature number, beginning and ending elevations, type of recovery unit, excavator, date assigned and checked in, and the number of bags recovered were noted in the log. In addition, a Master Identification Number (MID) was assigned to every 10 cm level of all units and each separate feature. All individual ID numbers assigned could then be referenced back to either a general level cut or a feature with relative ease. For example, a possible combination of ID numbers for a general level or feature could be as follows: a master ID number to record general information about the unit and to be used as a reference number for all associated ID's; a 0.25 inch recovery ID; a 0.06 inch recovery ID; a general level macrobotanical sample ID; separte ID's for each plotted specimen found; ID's for any other special samples taken; and separate ID's for any horizontal segments or strata within the level or feature. These same ID numbers followed any given artifact or group of artifacts from excavation through laboratory analysis and computer storage. The MID/nested ID system provided maximum control and ease of correcting errors through all stages of field and laboratory procedures.

Field Forms and Their Usage

Every ID number assigned in the field had to be paired with the appropriate field form(s) and material recovered before that ID could be recorded and processed in the lab.

General level MID's required a Field Provenience form (Figure V.3) and a Level/Stratum form (Figure V.5). The Level/Stratum

form was not computerized and recorded basic provenience information (e.g. site; block; unit; elevations), associated ID numbers and types, soils information, and excavator's observations and comments. The Field Provenience form was a computer coded summary of this information. Individual ID's requred either a Field Provenience form or a Special Sample form (Figure V.4), another computer summary form. Feature MID's required a Feature form (Figure V.6) and a Field Provenience form. Where the feature was a burial, in addition to Field Provenience, Feature, and Special Samples forms, a burial number was assigned and a Burial Record form (Figure V.7) was completed which detailed field observations on body orientation, postition, preservation, age and sex determinations, and component affiliation.

FIELD AND LABORATORY INTERFACE

Field Check-In Procedures

Field forms were checked for errors four times in the field. The excavator checked all ID forms he was responsible for before giving them to his team leader who checked them before giving them to the assistant director. After a daily check of all incoming forms, the assistant site director gave the forms to the waterscreen team leader who paired the forms with the appropriate material recovered and made sure that all the ID log information, the forms, and the bag tags matched. At any point along this checking network the form or tags could be turned back to the original excavator for corrections while the information was still remembered or available.

Field-to-Lab Check-In Procedures

Each day the waterscreen team leader took the bagged artifacts recovered that day to the laboratory. Then the bags were placed on the holding shelf if forms were not completed or if there was a discrepancy in a form, tag, or ID log. If all forms were present and information on forms and tags matched, the material and forms were recorded in the ID log as being checked into the lab on that date and placed on the Check-In shelf. A box for Forms-In-Holding and Forms Completed were paired with the appropriate storage shelf. Any questions about ID's or forms after this point were handled by the assistant laboratory director and the assistant field director. A weekly list which was cross-checked with the field ID log records was prepared by the lab of all outstanding ID's for a given site.

SPECIAL STUDIES

During fieldwork a number of special studies were instituted to expand and enhance the information recovered at each site. Efforts were made to receive, evaluate, and integrate the results of these studies with the fieldwork strategy at a given site. Special studies undertaken by trained specialists at many of the sites included geomorphological and soils consultations and tests, Carbon 14 dating, archaeomagnetic dating, faunal studies, paleo-botanical analyses, and botanical studies of the modern vegetation.

SUMMARY

The field procedures utilized during Phase I of the project were designed to be standardized for comparability throughout the investigations of eleven sites. These procedures changed relatively little from the planning stage of the project as presented in the original Research Design (Supplement I). The modifications which were made were in the realm of scheduling and sequencing of activities.

Appendix V, the Field Manual, contains more detail of the methods and techniques employed in the field. Due to the size and length of the data recovery necessary on this project, the principles of simplicity, cross-checking, and repetition were practiced.

LAB PROCEDURES

THEORETICAL PERSPECTIVE OF CLASSIFICATION

Artifacts result from intentional human behavior and form the empirical base for archaeological research. In any classificatory system, the set of attributes possessed by an object must be limited because of the potentially infinite number of possible observations that can be made for that object. Because the purpose of an artifactual classification system is to detect the behavior that produced the artifact, it is important to select the pertinent attributes for the research (Dunnell 1971).

In general, artifacts may be classified according to style, technology, and function. These major typological divisions have had a long history within archaeology. Dunnell (1971), Ford (1954), Krieger (1944), Rouse (1960), and Steward (1954), among others, discuss the various possibilities in archaeological classification. Their central classificatory concept is the full explanation of the derivation of the type. Thus, regardless of

the attributes chosen, whether they are historical (Ford 1954; Rouse 1960; Steward 1954), functional (Steward 1954), or technological (Rouse 1960), the statement of intent is explicit and may be carefully scrutinized and evaluated for its utility.

One must select attributes which yield the maximum information on the questions being asked. This presents many problems for the archaeologist. A single, all encompassing classification system becomes, by necessity, filled with contradictory and somewhat confusing permutations, which have been termed succinctly "dimensions of artifact variability" (Ahler Appendix III:E, this report). These dimensions must be independently controlled.

Recording the dimensions of artifact variability has been the single most pervasive assumption behind the Midden Mound Phase I analysis. The analytical system was designed to serve two basic functions. The first was to provide quick feedback for the field in terms of historical components and to a lesser extent gross technological differences. The second was to provide an accurate as possible, economical, and reliable data base for future research as well as subsequent Phase III intensive analyses.

Categorizing the lithic materials in this system is based on macromorphology. These categories were designed to demonstrate the general technological trajectory of biface production from early stage preform to projectile point/knife. It is modeled after Futato's (1980) Bear Creek drainage work in northwestern Alabama. Other technological aspects are less rigorously controlled, although they are noted within certain categories. Macromorphological categories of projectile point/knives were created to capture stylistic variability which in turn could be used to order assemblages and refine the culture history of the Upper Tombigbee Valley. Certain functional terms, such as "drill", "perforator", and "scraper", are used to describe lithic categories. These, however, are traditional morphological labels, not strict indicators of use.

Ceramic classification was also based on macromorphological criteria, specifically surface treatment/decoration and temper. These two variables were combined to establish ceramic category designations. Diagnostic appendages, rim sherds, and large sherds (usually basal) that exhibited hints of overall vessel morphology were treated separately from general body sherds.

One basic premise behind the current classification is the dichotomy of groups and classes. Groups consist of objects and can only be described. This is evident since the addition of new objects to a group is potentially infinite and each new specimen must be described separately. In contrast, classes are abstract and therefore must be arbitrarily defined according to specified criteria (Dunnell 1971). In this manner, recurrent and addi-

tional class members may be recognized by assessing their qualifications for membership within the class. This means that the Phase III analysis should strive for class definition, using the object oriented categories of Phase I as a starting point.

The data base produced by the current classification system should make the assessment of future research possibilities rather quick and painless. Further research should follow the basic typological concerns presented above as well as those of the project's lithic consultants (Appendix III).

The ultimate purpose of any classification is to serve as a basis from which we study certain aspects of human behavior and environment. If we assume that the interrelationships of technology and environment are paramount to understanding prehistoric human behavior and concomitant economic activities, then the multi-dimensionality of this behavior must be recognized and classification developed to account for that behavior.

Attaining the Phase I laboratory goals presented some problems. These concerns were dealt with on a daily basis and quick decision making determined the ultimate success or failure of the system. The following sections briefly describe the applications of these concepts to the reality of day-to-day laboratory routine.

METHODOLOGY

The methodology utilized in the laboratory during Phase I is presented in detail in the Laboratory Manual (Appendix IV). This section will briefly describe and summarize those procedures: material check-in, washing, sorting, cataloging, bagging, boxing, tool measurement, and macrobotanical sorting (Figure 4.2).

Material Check-in

Material from proveniences for which all forms had been completed were eligible for check-in. The forms were first checked against the bag tags and the Identification Number (ID) lists. The number of bags per ID was compared to the field ID log as a final check.

All special samples except for fine screen and macrobotanics were not processed further. These samples were boxed by category and ID number.

Washing

Washing was usually done outdoors behind the laboratory. During extremely cold or rainy weather washing was done inside. The washing process was basically a continuation of the waterscreening procedure. A garden hose with nozzle was used to spray water over the cultural material in a 0.25 inch mesh screen. Each specimen was sprayed and cleaned sufficiently for classification. The specimens were then placed on a drying screen.

Drying the washed material was done outside in the sunshine when the weather permitted. During inclement weather, the trays were placed in a specially constructed mass dryer in the laboratory. This drier is a large enclosed cabinet (16 by 4 by 6 feet) with two equal sections. Each section has an exhaust fan on top driven by a one-half horsepower electric motor and an electric heater at the base. The warm air from the heater is pulled through the screens of artifacts by the exhaust fan. The dryer contains a maximum of 44 drying trays and would dry the contents in 12-24 hours. Even with this special dryer, the sunshine was by far the quicker (2-3 hours maximum) and simpler method.

Sorting, Classification, and Cataloging

All cultural material was initially rough sorted into four material classes: ceramics, lithics (modified and debitage), introduced rock, and other (bone, shell, charcoal, historic). Each of these rough sorted classes was processed separately.

Ceramics

Ceramics were size graded through 0.5-inch mesh. Those greater than 0.5 inches were sorted into types by temper and surface treatment. The ceramic types used are defined in the next section of this report. The temper groups used in the ceramic analysis were as follows:

- shell
- shell/grog
- grog
- limestone
- bone
- sand
- fiber

Within these temper groups, the ceramic types follow those of Jenkins (1979). This analytical decision was made in close consultation with Jenkins in the planning stage of this project.

This was later reaffirmed during a review visit by Jenkins in July of 1980. Sherds exhibiting characteristics of vessel shape were separated and designated "diagnostic". These sherds included rims, bases, podal supports, handles, and the like. Sherds in each type were counted, weighed, and cataloged.

Ceramics passing through the 0.5 inch screen were classified as "sherdlets". These were collectively weighed and a 20% sample by weight was cataloged.

Daub and fired clay were also in the ceramic rough sorting category. These specimens were weighed and a 20% sample was cataloged.

Lithics

The lithic analytical system utilized in this project was designed to capture as much variability as possible and yet still process millions of specimens on a strict deadline. The system is described in detail in the Research Design (Supplement I) and the special reviews of the system by Ahler and Collins are presented in Appendix III of this report.

The lithics in this investigations include modified lithics and debitage. Lithics were classified into groups by morphology, technology, and function. The types are listed below.

- Projectile Point/Knives
- Bifaces
- Preforms
- Cores
- Scrapers
- Drills, Perforators, etc.
- Other Uniface and Biface Tools
- Ground Stone Tools
- Introduced Rock

The artifacts within each group were classified, counted, and cataloged. Type descriptions for the modified lithics are presented later in this chapter.

The lithic debitage which includes all flakes and fire cracked chert or chunks was size graded through 1.0, 0.5, and 0.25-inch mesh screens. Each size grade was sorted by chert type and utilization. The count and weight of each category were recorded and a 20% sample by weight was cataloged.

Introduced Rock

Introduced rock as an analytical term was used to refer to rock which did not naturally occur on the site but did not exhibit any observable modification by man. The specimens had simply been introduced to the site by the prehistoric occupants. Interpretive deductions could be made from the number and distribution of this material.

Twenty-five different rock categories were identified in the sample recovered in Phase I. These are defined in the next section of this chapter. In processing, the specimens in this group were identified lithologically, weighed and 20% were cataloged.

Other

This group of specimens represented items which were "other" than ceramics, lithics, or introduced rock. This included bone, shell, charcoal, or historic material. Modified bone or shell artifacts were identified as such. The low amount of historic material plus the lack of a developed historic classification system in 1979-1981 necessitated hand manipulation of the material. The categorization of these specimens is defined in a later section of this report.

Bone, shell, and charcoal specimens were weighed and cataloged. The historic material was separated into groups of metal, ceramic, and other. The specimens were counted, weighed, and cataloged.

Tool Measurement

Tool measurement was initiated in August 1980 after nine months of data recovery. A trial period of two weeks with time and task controls was conducted for feasibility studies. The results of this trial indicated that the laboratory staff was capable of the measurement tasks within the constraints of time and funding. Therefore, the measurement of all recovered stone tools was begun.

The procedures of tool measurement are presented in detail in the Laboratory Manual (Appendix IV). Basically, the procedures followed those developed by Futato (1975). The measurements taken are listed below.

Projectile Point/Knives
   length (maximum)

width (maximum)
thickness
basal width
shoulder width
juncture width
haft element length

Biface Blades
length
width
thickness
element length (Expanding Triangular Biface Blades only)
basal width (Broad Base Triangular Blade only)

Preforms, Cores, Scrapers, Other Uniface and Biface Tools
weight
length
width
thickness

Ground Stone Tools
weight
length
width
thickness
drill hole diameter (Beads, Atlatl Weights, and Gorgets only)

Measurements were taken in orientation to flake morphology when identified. Symmetrical specimens were measured on the basis of the midline. Tools which were neither symmetrical nor possessed an observable flake orientation were measured according to absolute dimensions.

The measurements were recorded on computer code sheets developed specifically for this procedure (Appendix IV). The data is presented in Appendix I and Supplement II to this report.

Tool measurement was performed by the same individuals throughout Phase I. This helped retain consistency in the data.

The measurement process also served as a cross-check in artifact classification. Errors were indentified and corrected through the Field Specimen Correction form (Appendix IV).

Boxing and Bagging

Curation of the large number of specimens recovered in Phase I was done with two objectives in mind. The first was to maintain the specimens in their present condition preventing further

deterioration. Second was to allow access to the collection for future studies.

Most of the specimens were contained in coin envelopes. These were then grouped into plastic bags by ID number and placed into larger plastic bags lining the inside of custom made cardboard boxes 1 by 1 by 1.5 feet in size. The collection was organized by artifact group, and then by ID number within the groups. The boxes were labeled on the outside for ease of reference. These were maintained in an organized manner in the field headquarters prior to transfer to the University of West Florida archaeological storage facilities.

Summary

The laboratory operations in Phase I of this project were designed to process millions of specimens under stringent time and funding constraints. The classification system was organized to capture the maximum amount of information on form, function, and manufacture of the specimens recovered. The level of analysis performed is considered preliminary to further detailed studies. Throughout the course of the 20 months of work, efficiency improved and the primary concern of all the senior staff became the maintenance of a consistent application of the classification system and procedures. This was difficult due to the simultaneous operation of two large labs with their large staffs, and personnel turnover during the lengthy extent of Phase I. It should be realized that this is the weakest part of the laboratory system. However, the controls were applied to the best of the ability of all professionals directing the project.

ANALYTIC CLASSIFICATION

Introduction

The following categories are based on the "theoretical" and methodological approaches advocated in the introductory section. They follow an order of presentation congruent with the laboratory processing system (Lab Manual, Appendix IV).

Ceramic categories are briefly described and referenced to major ceramic studies. Selected photographs of representative ceramic categories are included under individual site reports and cross-referenced with the general type descriptions.

Line drawings are presented for purposes of morphological and technological description of each lithic category. In the case

of projectile point/knives, a single representative specimen is usually illustrated along with the verbal description unless there is a wide range of variation. In this situation, two or more line drawings may be included for a single category to show that variation.

Other categories such as biface blades, preforms, cores, scrapers, drills, other uniface and biface tools, and groundstone tools are usually represented by single examples. Site specific artifacts are photographed to show representative samples from those sites to enhance description and interpretation. Special illustrations of unique artifacts may be found in individual site reports. They are also cross-referenced under the general description in this section.

Metric data for specified categories are recorded in tabular form by site in Appendix I along with the general recovery (block, test unit, surface collection, etc.), vertical, and horizontal distributions. A summary of the artifacts and other materials recovered from features is also given in Appendix II. An inventory of artifacts and other materials at their highest level of classification and provenience is microfiched and presented in Supplement 3.

Prehistoric Ceramics

The prehistoric ceramic categories used in the Phase I analysis are presented below. There are 86 major ceramic categories recognized in the analysis in addition to sherdlets (sherds which passed through 1/2" mesh), fired clay, and daub. These categories are enumerated in Appendix I and Supplement 3 as well as in varying sections of the report under individual site discussions.

The categories are referenced and described in a brief, concise statement. A major dichotomy is present in the classification between diagnostic and nondiagnostic sherds. The diagnostic division includes all rim sherds, basal sherds, appendages, or sherds indicative of overall vessel form. The nondiagnostic division includes all other sherds.

Certain decorated wares are illustrated with line drawings. These are mainly the Mississippian, Alexander, and Wheeler ceramics. Representative examples of other sherd types are photographed and included under individual site reports.

The ceramic categories are presented generally in chronological order from most recent to earliest (major temper groupings).

Shell Tempered, Shell-Grog Tempered

Bell Plain: (N=12)This ceramic category is recognized on the basis of surface finish and paste composition. The sherds have a burnished, polished, undecorated surface often resembling a "black film." The tempering as noted by Phillips is composed of fine shell particles embedded in a fine paste (Jenkins 1979; Phillips 1970).

Mississippi Plain: (N=1509)This category represents a super-type to cover all plain, coarse shell tempered pottery which does not have a polished surface. Lenticular shaped areas of leached shell often are visible on the surface and sherd edges (Jenkins 1979; Phillips 1970; Steponaitis 1980).

Decorated Shell Tempered: (N=34)This is a catch-all category for all shell tempered ceramics which have surface decoration or treatment. Such attributes as painting, incising, engraving, punctating, and cord marking were used to place shell tempered ceramics under this heading (Jenkins 1979; Phillips 1970; Steponaitis 1980; this paper).

Eroded Shell Tempered: (N=437)This category contains shell tempered pottery which has been eroded or pitted on the surface in such a way that the former decoration or surface treatment could not be detected. The presence of a plain shell tempered sherd could not be verified due to the erosion (this paper).

Shell-Grog: (N=584)This category contains all sherds whose paste contains both grog (crushed potsherds) and shell. The sherds are usually predominately grog tempered with sparse inclusions of coarse mussel shell (Jenkins 1979).

Grog Tempered

Baytown Plain: (N=2061)This is a plain grog tempered ceramic type characterized by the inclusion of small crushed or pulverized sherds, generally less than 3 mm in diameter. Some sand is also included in the paste. Jenkins has divided Baytown Plain into two major varieties based on the relative amounts of grog and sand included within the paste. No such distinction was made for the Phase I ceramic analysis (Ford, Phillips, and Haag 1955; Greengo 1964; Jenkins 1979; Koehler 1966; Phillips 1970; Phillips, Ford, and Griffin 1951).

Mulberry Creek Cord Marked: (N=966)This category is characterized by grog tempering and cord marking. The cord marking was accomplished by wrapping a paddle with cords and malleating the clay coils together. Cord markings are overstamped, vertical to

the rim, horizontal to the rim, and combinations thereof (Ford 1951; Ford, Phillips, and Haag 1955; Haag 1939; Jenkins 1979; Koehler 1966; Oakley and Futato 1975; Phillips 1970; Phillips, Ford, and Griffin 1951).

Alligator Incised: (N=6)This is a grog tempered type which is primarily undecorated except for sloppily executed incisions, primarily on the upper portion of the pot. The incisions may be vertical or oblique to the lip, form crude triangular designs, or be randomly applied or criss-crossed over the entire vessel. Jenkins established three varieties, but these were not used in the Phase I analysis (Jenkins 1979; Phillips 1970).

Cormorant Cord Impressed: (N=78)This type is characterized by a decorative, narrow band of cord impressions which parallels the rim, just below the lip. These cord impressions are applied at 45° angles to the lip, or may be parallel to it. The lower boundary of the band is characterized by a linear row of small punctations or one or more rows of horizontal cord impressions. The rim of the vessel may exhibit ticking just under the lip. The temper consists of minute fragments of grog about 1 mm in size, but the paste is very sandy (Jenkins 1979; Phillips 1970; Phillips, Ford, and Griffin 1951).

Withers Fabric Marked: (N=21)This grog tempered type exhibits a fabric impressed surface treatment, created by the application of a cord wrapped stick or dowels intertwined with fabric and applied to a hand smoothed surface to strengthen the vessel walls. The temper is like that of Baytown Plain. Jenkins recognizes four varieties in his collections, however, the Phase I analysis did not utilize these (Ford, Phillips, and Haag 1955; Haag 1942; Jenkins 1979; Phillips 1970; Phillips, Ford, and Griffin 1951).

Eroded Grog Tempered: (N=1090)This category includes grog tempered sherds which have been eroded or pitted on the surface to the extent that any former decoration or surface treatment could not be detected. The presence of a plain grog tempered sherd could not be verified due to the erosion (this paper).

Grog Tempered Other : (N=12)This category includes grog tempered sherds which do not conform to any of the other grog tempered categories. This may include sherds with incisions, or sherds with other unusual surface treatments (this paper).

Bone Tempered

Turkey Paw Plain: (N=216)This is a bone tempered ceramic type which is undecorated. Bone inclusions constitute up to 5% of the paste in Jenkins' collections from the Central Tombigbee Valley.

In the Phase I analysis a sherd was considered to be bone tempered if three to four pieces of bone were clearly visible in the paste (Jenkins 1979).

Turkey Paw Cord Marked: (N=47)This is a bone tempered pottery type which has a paste similar to Turkey Paw Plain. The exterior of the vessel has been malleated with a cord wrapped paddle over most of the surface (Jenkins 1979).

Eroded Bone Tempered: (N=85)This category includes sherds which have been eroded or pitted on the surface. The condition of the surface is such that any former decoration or surface treatment could not be detected. The presence of a plain bone tempered sherd could not be verified due to the erosion (this paper).

Bone Tempered Other: (N=7)This category includes sherds which do not conform to any of the other bone tempered categories. These may include incised sherds or sherds with other unusual surface treatments (this paper).

Limestone Tempered

Mulberry Creek Plain: (N=603)This is a limestone tempered pottery type with an undecorated plain surface. Fragments of crushed limestone, generally less than 2 mm in diameter, constitute about one-fourth of the paste. In places where the limestone has leached out, small holes are present (Broyles 1958; Faulkner 1968; Griffin 1974; Haag 1939; Heimlich 1952; Jenkins 1979).

Pickwick Complicated Stamped: (N=7)This is a limestone tempered type whose paste composition is like that of Mulberry Creek Plain. It is a paddle stamped ware which has either curvilinear or rectilinear design motifs present over most of the exterior. Jenkins has defined two varieties, one with sloppy concentric circles and the other with rectilinear line block and line filled oval motifs similar to some Woodstock and Napier motifs (Broyles 1958; Faulkner 1968; Griffin 1974; Haag 1939, 1942; Heimlich 1952; Jenkins 1979; Wauchope 1966).

Wright Check Stamped: (N=4)This category is characterized by an exterior which has been malleated with a gridded paddle. The checks formed by the paddle stamping may be either square to rectangular or rhomboidal. Jenkins set up two varieties of Wright Check Stamped based on grid composition. The paste is similar to that of Mulberry Creek Plain (Broyles 1958; Faulkner 1968; Griffin 1974; Haag 1939; Heimlich 1952; Jenkins 1979).

Flint River Cord Marked: (N=111)This category includes sherds which have a paste similar to Mulberry Creek Plain. The exterior of the vessel has been malleated with a cord wrapped paddle, leaving cord markings or cord impressions applied over most of the vessel (Heimlich 1952; Oakley and Futato 1975).

Long Branch Fabric Marked: (N=63)This category includes sherds which have a paste similar to Mulberry Creek Plain. The surface of the exterior has been malleated with a cord wrapped dowel or with dowels interwoven with fabric (Broyles 1958; Faulkner 1968; Griffin 1974; Haag 1939; Heimlich 1952; Sears and Griffin 1950a).

Eroded Limestone Tempered: (N=708)This category includes limestone tempered sherds which have been eroded or pitted on the surface. The condition of the surface is such that any former decoration or surface treatment could not be detected. The presence of a plain limestone tempered sherd could not be verified due to the erosion (this paper).

Limestone Tempered Other: (N=8)This category contains sherds which do not conform to any of the other limestone tempered categories. It may include sherds with incisions or sherds with other unusual surface treatments (this paper).

Sand Tempered - Miller

Saltillo Fabric Marked: (N=2078)This is a sand tempered type which has an impressed fabric surface treatment. The paste composition is the same as that of the Residual Sand Tempered Plain category. The fabric impressions are made by wrapping a dowel with cordage or by weaving together several dowels and malleating the exterior vessel walls. Jenkins recognizes two varieties within the Gainesville Lake sample; however, these were not considered in the Phase I analysis (Bohannon 1972; Cotter and Corbett 1951; Jenkins 1975, 1979; Jennings 1941, 1944).

Furrs Cord Marked: (N=779)This category includes sherds which have a paste composition similar to that of the Residual Sand Tempered Plain category. The exterior of the vessel has been malleated with a cord wrapped paddle applied either vertically or obliquely to the lip. Sometimes the cord marking extends onto the lip and is smoothed (Bohannon 1972; Cotter and Corbett 1951; Jenkins 1975, 1979; Jennings 1941, 1944).

Sand Tempered - Alexander

Alexander Incised: (N=1407)This is a sand tempered type. Twenty to thirty percent of the paste is composed of sand grains less than 2 mm in diameter. The texture ranges from fine to coarse. The surface decoration is composed of incised lines of varying design. The neatness of the incisions varies from excellent to fair with chevron filled triangles surrounded by line filled triangles, narrow line diamond patterns formed by cross hatching, parallel lines encircling the vessel, concentric triangles with a keyhole like motif in the center, and rectilinear interlocking "T" shaped motifs. Jenkins has described five varieties based on differential design motifs from the Gainesville Lake area of the Central Tombigbee Valley. No such attempt was made in the Phase I analysis; however, some of the individual motif variations and their relative frequency of occurrence are discussed under specific site reports (Ford and Quimby 1945; Haag 1939; Heimlich 1952; Jenkins 1979; Phillips 1970; Willey 1949; Wimberly 1960).

Alexander Pinched: (N=1738)Sherds included in this category have a paste composition similar to that of the Alexander Incised category. The surface treatment usually consists of parallel rows of fingernail pinching or punctating. The fingernail punctate is considered here to be a form of pinching as opposed to punctation with a non-fingernail implement as found in Columbus Punctated (Ford, Phillips, and Haag 1955; Ford and Quimby 1945; Haag 1939, 1942; Heimlich 1952; Jenkins 1979; Phillips 1970; Wimberly 1960).

Alexander Incised/Pinched: (N=95)Sherds included in this category have a paste composition resembling that of the Alexander Incised category. Incised sand tempered sherds also have areas of fingernail pinching or punctating (this paper).

Alexander Incised/Punctated: (N=121)Sherds included in this category have a paste composition similar to that of the Alexander Incised category. The incising is often intermixed with punctations similar to those of Columbus Punctated (this paper).

Columbus Punctated: (N=300)This is a fine sand paste tempered type of the Alexander Series. Panels of hemicoidal punctations generally less than 2 mm in width decorate the vessel (Heimlich 1952; Jenkins 1979; this paper).

O'Neal Plain: (N=58)This is virtually a plain tempered type of the Alexander Series. Its historical use as a catch-all for plain sand tempered types in the Tennessee Valley area (Heimlich 1952) has been circumvented due to the inability to separate plain sand tempered sherds of the Alexander (Gulf Formational) and Miller (Middle Woodland) Series. The type O'Neal Plain is

reserved for those decorated sherds with a linear arrangement of punched-through nodes just below the lip, or those with rim ticking (Heimlich 1952; this paper).

Smithsonia Zone Stamped: (N=50)This type was first described by Haag as a zone incised/stamped ware. It consists of zoned areas of stamping and/or regular punctation (Haag 1939; Heimlich 1952; this paper).

Miscellaneous Sand Tempered

Eroded Sand Tempered: (N=15,152)This category includes sand tempered sherds which have been eroded or pitted on the surface. The condition of the surface is such that any former decoration or surface treatment could not be detected. The presence of a plain sand tempered sherd could not be verified due to the erosion (this paper).

Sand Tempered Other: (N=76)This category includes sherds which do not conform to any of the sand tempered categories. These may include sherds with incisions or sherds with other unusual surface treatments (this paper).

Residual Sand Tempered Plain: (N=3812)This is a catch-all category for all plain sand tempered sherds, regardless of form. The paste of this category varies from a fine sand, with particles less than 1 mm in diameter, to a coarse grained sand with particles greater than 1 mm in diameter. Some rim forms may be assignable to either the Miller or Alexander series with additional study. Herein, all plain Alexander and Miller ceramics are lumped under this category due to the difficulty in sorting them objectively (this paper).

Fiber Tempered

Wheeler Plain: (N=1922)This is a fiber plain type characterized by dense to sparse fibrous inclusions in the paste. The paste consists of fibers intermixed with sand and clay. The amount of fiber in the paste ranges from 5% to 25% with some sherds containing a small amount of grog. Jenkins has described two varieties of Wheeler Plain based on the percentage of fiber and sand in the paste. The Phase I analysis has not dealt with ceramics on a variety basis (Haag 1939, 1942; Heimlich 1952; Jenkins 1979; Sears and Griffin 1950).

Wheeler Dentate Stamped: (N=416)Sherds included in this category have a paste similar to that of the Wheeler Plain category. The

sorting criterion is the application of a stamp to the exterior walls of the vessel. Non-patterned linear "rows" of dentate stamping are located over most of this surface. The stamping resembles small rectilinear checks in single, parallel rows, and overstamping occurs (Jenkins 1979; Sears and Griffin 1950).

Wheeler Punctated: (N=497)This is a decorated type with a paste similar to that of the Wheeler Plain category. The exterior vessel walls have been punctated using a sharp implement. The rounded to linear punctations may occur in linear rows or in a non-patterned manner (Jenkins 1979; Sears and Griffin 1950).

Wheeler Simple Stamped: (N=36)This is a decorated type with a paste similar to that of the Wheeler Plain category. The outside walls of the vessel were malleated with an implement which left thin, short impressions that were criss-crossed or applied singularly in a non-patterned manner (Jenkins 1979; Sears and Griffin 1950).

Eroded Fiber Tempered: (N=2489)This category includes sherds which have been eroded or pitted on the surface. The condition of the surface is such that any former decoration or surface treatment could not be detected. The presence of a plain fiber tempered sherd could not be verified due to the erosion (this paper).

Fiber Tempered Other: (N=45)This category includes fiber tempered sherds which do not conform to any of the fiber tempered categories. Sherds tempered with both fiber and grog were placed under this category. In addition, sherds which possessed unusual surface treatments were included here (this paper).

Miscellaneous

Sherdlets: (Wt=50,688 g)This category includes small sherds of varying temper and surface treatment which pass through a 1/2" mesh. These were only weighed in the Phase I analysis (Chapman 1975; Jenkins 1979; this paper).

Fired Clay: (Wt=324,367 g)This category includes amorphous pieces of fired clay which are reddish-orange in color and have a soft to medium hardness.

Daub: (Wt=2885 g)This category includes pieces of fired clay that have been impressed with cane, sticks, or other vegetal materials.

Prehistoric Lithics

Chipped Stone Tools

Projectile Point/Knives: The following description of projectile point/knife categories is based on published and unpublished documents and on the Phase I point collection from all sites. These brief descriptions contain the basic sorting criteria used in the analysis. When combined with the line drawings, photographs, and metric data, they serve as macromorphological categories which can communicate stylistic information to other researchers. The large volume of material, coupled with the limited time available for rigorous classification, required the adoption of this system. While obviously suffering from a lack of precise descriptive and quantitative measures, it is a reasonable compromise to facilitate the following two goals. First, these brief descriptions should suffice for accurate chronological and cultural assessment of components. Second, they will allow convenient and easy access to the projectile point/knife categories for the purpose of Phase III intensive study.

During the development of the classification system for this project (1979), projectile point/knife classification in the mid-South was undergoing extensive revision. Faulkner and McCollough (1973) had established "clusters" in the Normandy Reservoir of the Middle Tennessee Valley. Futato (1977) was developing this system in the Bear Creek Watershed of the Middle Tennessee Valley, as was Ensor (1980,1981) in the Gainesville Reservoir of the Central Tombigbee Valley. In conference with Futato and Ensor, as well as contracting agency representatives, it was decided not to use cluster analysis due to the lack of sufficient chronological work in the Upper Tombigbee Valley in stratified Archaic deposits and the developmental nature of the nearest pertinent work. The terminology employed in the descriptive categories follows Futato (1977).

Formal measurements were made of all projectile point/knife specimens which were the same as those use by Futato and Ensor in their cluster analysis. Therefore all work was comparable and could be used in future research.

Since the end of data recovery and classification of this project, Ensor (1982) has completed the Gainesville projectile point/knife analysis. Correlation of the categories used in our project and those of the Gainesville area is presented in Table 4.1. Temporal spans for the Upper Tombigbee Valley differ somewhat from those in the Central portion.

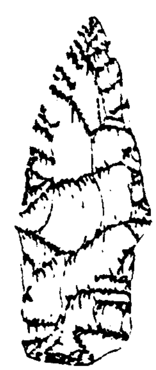
The categories employed here do not take into account the technological and functional properties which lend themselves to the

study of activities and tasks (Ahler, Appendix III). This will be a major consideration of the Phase III analysis. The proposed technological sequence of core-preform-biface blade-projectile point/knife does provide a framework which has the potential to account for the various steps and practices involved in projectile point/knife manufacture. This system, when expanded in Phase III to account for the other dimensions of artifact variability, should prove adequate for the detailed study of human behavior with regard to this class of artifacts.

The descriptions of most of the projectile point/knife categories are supplemented by line drawings of representative specimens. In addition, selected photographs of specimens from the various sites are presented in the site chapters (5-14). The measurement data from these and other stone tools are presented in two places in this report. The raw data measurement catalog is contained in Supplement IV. It includes the measurements recorded for each specimen measured and its catalog number. Appendix I contains the summarized data for each site by category with all measurements and the number of specimens presented. The reader is referred to these documents for size dimensions of all artifact categories measured during Phase I. Summary statistics for the entire Phase I collection are presented in Tables 4.2 - 4.9. The category definitions are presented in the following sections and are arranged by tool type and category. For convenience the projectile point/knife categories are listed in alphabetical order, irrespective of chronological position. In some cases, especially with 22IT563, 22IT576, and 22IT590, the classification of projectile point/knives was taken further and subdivisions were made of some categories. These subdivisions are defined in the report of investigations at each site (Chapters 6, 7, and 8). The projectile point/knife summary statistics are presented in Table 4.2.

<u>Baker's Creek</u> - (N=1)This is a medium-sized hafted biface with straight to excurvate blade edges, straight horizontal to tapered shoulders, a straight expanding haft element, and a straight to excurvate base.

Flaking appears to be by soft hammer percussion with secondary retouch present along the blade margins (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Perino 1971). Middle Woodland.



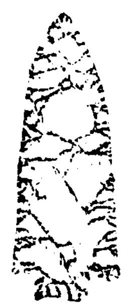
Beachum - (N=11)This is a medium-sized hafted biface with excurvate blade edges, incurvate horizontal to straight horizontal shoulders (rarely barbed), an incurvate expanding to concave haft element, and an incurvate base.

Flaking is by percussion, with some secondary retouch. The cross-section is biconvex (Brookes 1979; this volume). Middle Archaic.

Beaver Lake - (N=1)This is a medium-sized hafted biface with recurvate blade edges and an incurvate to recurvate base.

Percussion flaking often forms a median ridge, with some collateral retouch flaking producing a fine bifacial edge. The cross-section is biconvex to median ridged. The base and haft element edges are usually ground (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Ensor 1980; Perino 1968). Early Archaic.

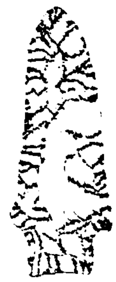
Benton Barbed - (N=16)This is a medium-sized to large hafted biface with excurvate, straight, or incurvate blade edges, incurvate barbed shoulders, straight expanding parallel, or contracting haft element, and a straight to incurvate base.



Flaking appears to be soft percussion, with steeply beveled haft element and blade margins.

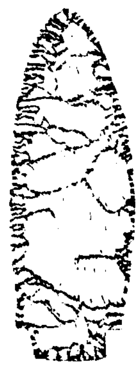
The cross-section is biconvex to flattened (Cambron and Hulse 1975; Futato, personal communication 1980; Kneberg 1956; Lewis and Lewis 1961). Late Archaic.

<u>Benton Extended Stemmed</u> - (N=65)This is a medium-sized to large hafted biface with excurvate, straight, or incurvate blade edges, incurvate to straight horizontal or tapered shoulder, a straight expanding, parallel, or contracting haft element, and a straight to incurvate base. The "stem" or haft element length to width ratio is 2:1 or greater, the haft being longer than it is wide.



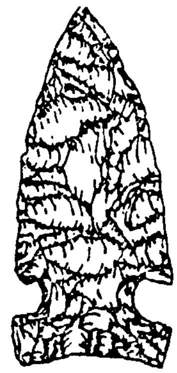
The flaking and cross-section resemble Benton Barbed (Cambron and Hulse 1975; Futato, personal communication 1980; Kneberg 1956; Lewis and Lewis 1961).

<u>Benton Short Stemmed</u> - (N=276)This is a medium-sized to large biface with excurvate, straight, recurvate, or incurvate blade edges, incurvate to straight horizontal or tapered shoulders, a straight expanding, incurvate expanding, parallel, or contracting haft element, and a straight to incurvate base. The "stem" or haft element width to length ratio is 2:1 or greater, the haft being wider than it is long.



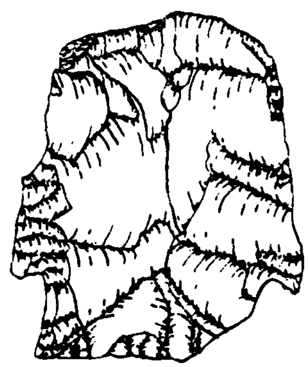
The flaking and cross-section are like the Benton Barbed (Cambron and Hulse 1975; Futato, personal communication 1980; Kneberg 1956; Lewis and Lewis 1961). *Late Archaic.*

Big Sandy - (N=17)This is a small to medium-sized hafted biface with straight to excurvate blade edges, straight horizontal shoulders, an angular expanding haft element, and an excurvate, incurvate, or straight bases. The angular expanding haft element creates a distinctive "side notching." These side notches and the base are usually ground.



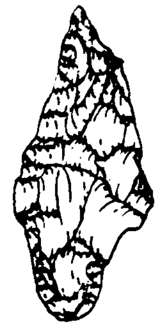
Flaking is by percussion, with pressure retouch. The cross-section may be biconvex, median ridged, plano-convex, or rhomboid (Bell 1960; Cambron and Hulse 1960, 1964, 1975; Ensor 1980; Kneberg 1956; Lewis and Kneberg 1959). Early Archaic.

Big Slough - (N=1)This is a medium-sized to large hafted biface with excurvate to recurvate blade edges, incurvate barbed shoulders, a straight to incurvate expanding haft element, and an excurvate base.



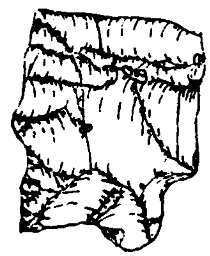
Flaking is most likely by soft hammer percussion, with secondary retouch present on blade and haft element edges. The cross-section is biconvex (Cambron and Hulse 1960, 1964, 1975). Late Archaic.

Bradley Spike - (N=4)This is a small to medium-sized hafted biface with straight to excurvate blade edges, incurvate horizontal to straight tapered shoulders, and a straight contracting haft element and a straight to excurvate base.



Flaking is by percussion with, some light retouch. The cross-section is biconvex to median ridged (Cambron and Hulse 1964, 1975; Ensor 1980; Kneberg 1956). Middle Woodland.

Buzzard Roost Creek - (N=1)This is a medium to large hafted biface with straight excurvate to recurvate blade edges, horizontal to barbed shoulders, a straight expanding to parallel haft element, and a recurvate base.

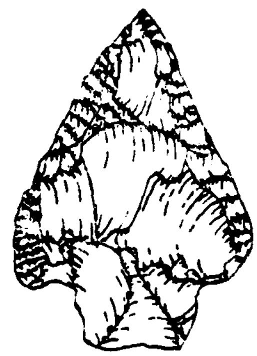


Flaking is by percussion, with steep beveled retouch present along the haft element. The cross section is biconvex (Cambron 1958; Cambron and Hulse 1964, 1975). Late Archaic.

Collins - (N=1)This is a small, thin, hafted biface with straight to excurvate blade edges, straight tapered to straight horizontal shoulders, a straight to incurvate expanding haft element, and a straight to incurvate base.

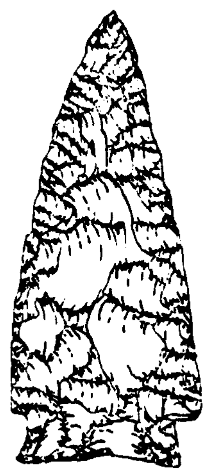
Flaking is probably by soft hammer percussion and/or pressure retouch. The cross-section is flattened (Brain 1971; Ensor 1980). Late Woodland/Mississippian.

<u>Cotaco</u> <u>Creek</u> - (N=12)This is a medium-sized to large hafted biface with straight to excurvate blade edges, straight horizontal to incurvate barbed shoulders, a straight parallel haft element, and a straight to excurvate base.



Flaking is probably by hard hammer and soft hammer percussion with retouch creating a slightly serrated appearance on the blade edges. The cross-section is flattened to biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Perino 1971). Late Archaic.

<u>Crawford</u> <u>Creek</u> - (N=10)This is a medium-sized hafted biface with straight blade edges, tapered, horizontal, or barbed shoulder, a straight parallel to straight expanded haft element and a straight base.

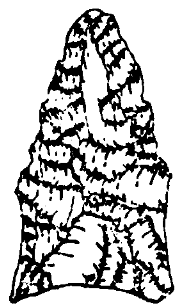


Flaking is by random percussion, with pressure retouch along the blade edges creating a serrated edge. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962). Middle Archaic.

Cypress Creek - (N=26)This is a medium-sized to large hafted biface with excurvate to straight blade edges, incurvate to straight barbed shoulders, an incurvate to straight expanding haft element, and a straight base.

Flaking is by percussion, with pressure retouch. The cross-section is biconvex (Lewis and Lewis 1961; this volume). Early Archaic.

Dalton - (N=9)This is a medium-sized lanceolate hafted biface with excurvate to straight blade edges, no shoulders, an incurvate to straight expanding haft element and an incurvate base.



Flaking is by percussion, with alternating pressure retouch forming serrations. The cross-section is biconvex to rhomboidal (Bell 1958; Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Ensor 1980; Lewis and Kneberg 1958). Early Archaic.

Elora - (N=6)This is a medium to large hafted biface with straight to excurvate blade edges, rounded and tapered shoulders, a straight or incurvate haft element, and an unfinished straight to excurvate base.

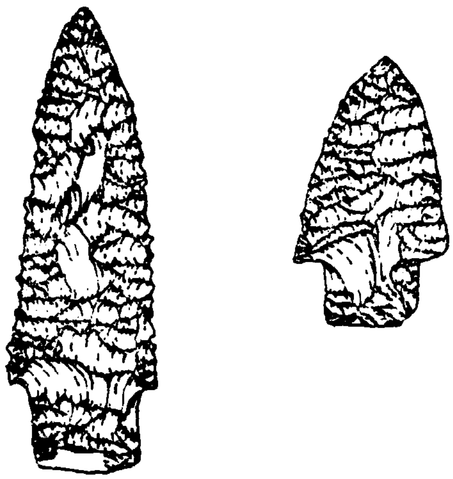
Flaking is by percussion, with pressure secondary retouch. The cross-section is biconvex (Cambron and Hulse 1964, 1975). Late Archaic.

Eva - (N=43)This is a medium-sized to large hafted biface with excurvate blade edges, incurvate barbed shoulders, a straight parallel to contracting haft element, and a straight to excurvate base. These points have a "basal notch" effect produced by alternate percussion blows perpendicular to the base.

Flaking is by shallow percussion, with some secondary retouch. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Kneberg 1956; Lewis and Lewis 1961; Perino 1968). Middle Archaic.

Flint Creek - (N=279)This is a medium-sized to large hafted biface with excurvate blade edges, incurvate horizontal to barbed shoulders (rarely, straight tapered), an excurvate to straight expanding haft element, and an excurvate to straight base.

Flaking is by percussion, with fine serrations along the blade margins being common. The cross-section is biconvex (Cambron 1958; Cambron and Hulse 1964, 1975; Ensor 1980; Perino 1971). Late Archaic/Gulf Formational.



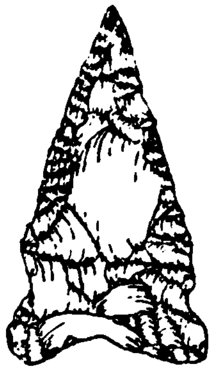
__Flint River Spike__ - (N=1)This is a small to medium-sized hafted biface with excurvate to straight blade edges, no shoulders, no lateral haft element edges, and an excurvate base.

Flaking is probably by soft hammer percussion with minimal secondary retouch. The cross-section is median ridged or biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962). Middle Woodland.

__Gary__ - (N=22)This is a medium-sized to large hafted biface with straight, excurvate, incurvate, or recurvate blade edges, straight horizontal to tapered shoulders, a straight contracting haft element, and a straight to excurvate base.

Flaking is most likely by hard hammer and/or soft hammer percussion, with some secondary retouch. The cross-section is biconvex (Bell 1960; Cambron and Hulse 1964, 1975; Ensor 1980; Ford, Phillips, and Haag 1955; Newell and Krieger 1949). Late Archaic.

Greenbrier - (N=26)This is a medium-sized to large hafted biface with excurvate blade edges, incurvate to straight tapered shoulders, an incurvate to straight expanding haft element, and an incurvate base.

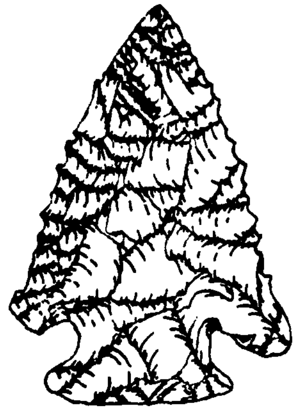


Flaking is by percussion, with secondary retouch. The cross-section is flattened to biconvex. The haft element is ground (Brooks 1979; Brooks et al. 1974; Cambron and Hulse 1964, 1975; Lewis and Kneberg 1960). Early Archaic.

Hardaway - (N=1)This is a small to medium-sized hafted biface with straight to excurvate blade edges, incurvate or straight tapered shoulders, an incurvate to straight expanding haft element, and a recurvate base.

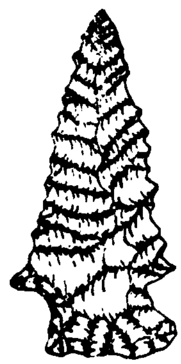
Flaking is by percussion, with retouch present over most edges. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Coe 1959, 1964; Ensor 1980). Early Archaic.

<u>Kirk Corner Notched</u> - (N=90)This is a medium-sized to large hafted biface with straight to excurvate blade edges, incurvate to straight barbed shoulders, a straight incurvate expanding haft element, and a straight, incurvate, or excurvate base.



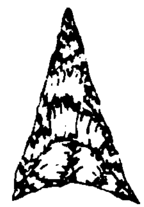
Flaking is by percussion, with secondary retouch often creating a serrated, beveled blade. The cross-section is biconvex to flattened. The base is usually ground (Brookes 1971; Cambron and Hulse 1964, 1975; Chapman 1975; Coe 1959, 1964; Ensor 1980). Early Archaic.

<u>Kirk Stemmed</u> - (N=1)This is a medium-sized to large hafted biface with straight to incurvate blade edges, straight horizontal to tapered shoulders, straight to incurvate expanding or parallel haft element, and straight to incurvate base.



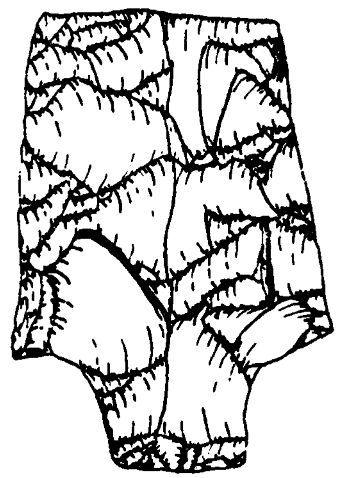
Flaking is probably by hard and soft hammer percussion, with secondary retouch often forming serrated blade edges. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Coe 1959, 1964). Early Archaic.

Late Woodland-Mississippian Triangular - (N=272)This is a small, thinned hafted biface with straight to incurvate blade edges and a straight to incurvate base. A rare example may have a slightly excurvate base or blade edge.



Flaking is by both percussion and pressure retouch. The cross-section is flattened (Cambron and Hulse 1964, 1975; Ensor 1980; Perino 1968; Scully 1951). Late Woodland/Mississippian.

Ledbetter-Pickwick - (N=46)This is a medium-sized to large hafted biface with recurvate to straight blade edges, incurvate or straight tapered to horizontal shoulders, a straight contracting to parallel haft element, and a straight base.



Flaking is by percussion, with some retouch along the blade margins. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Kneberg 1956). Late Archaic.

Limestone - (N=2)This is a medium-sized hafted biface with straight blade edges, straight tapered or horizontal shoulders, a straight parallel or incurvate expanding haft element, and an incurvate basal edge.

Flaking is most likely by non-patterned soft hammer and hard hammer percussion, with some retouch. The cross-section is biconvex (Cambron and Hulse 1964, 1975). Late Archaic.

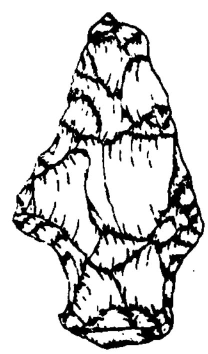
Little Bear Creek - (N=292)This is a medium-sized to large hafted biface with excurvate to straight blade edges, straight horizontal to tapered shoulders, a straight parallel haft element, and a straight base.

Flaking appears to be by hard and soft hammer percussion, with some secondary retouch along blade margins. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Ensor 1980; Oakley and Futato 1975). Late Archaic/Gulf Formational.

McCorkle Stemmed - (N=1)This is a medium-sized hafted biface with straight to excurvate blade edges, incurvate to straight barbed shoulders, expanding haft element with a deep basal notch forming a recurvate base.

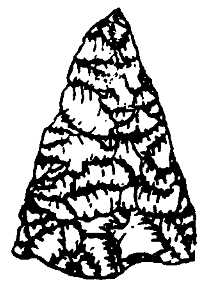
Flaking is by percussion, with retouch present over most of the edges. Cross-section is biconvex. The base is usually ground (Broyles 1966; *Chapman 1975*). *Early Archaic*.

McIntire - (N=33)This is a medium-sized hafted biface with straight to excurvate blade edges, incurvate horizontal, tapered, or slightly barbed shoulders, an incurvate expanding haft element, and a straight base.



Flaking is by percussion, with minimal retouch. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Ensor 1980). Late Archaic.

Morrow Mt. - (N=38)This is a medium-sized hafted biface with excurvate blade edges, straight horizontal to tapered shoulders, a straight contracting haft element, and an excurvate base.



Flaking is by shallow percussion, with some retouch to finish blade edges and haft elements. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Coe 1959, 1964). Middle Archaic.

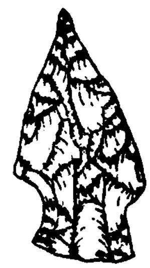
Morrow Mt. Rounded Base - (N=5)This is a medium-sized to large hafted biface with excurvate blade edges and an excurvate base. This form is similar to the biface blade category Broad Base Triangular, but with the corners removed.

Flaking is by percussion, with some retouch. The cross-section is flattened to biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962). Middle Archaic.

Morrow Mt. Straight Base - (N=16)This is a medium-sized hafted biface with excurvate blade edges, incurvate horizontal to barbed shoulders, a straight parallel to straight contracting haft element, and a straight base.

Flaking is by percussion, with some fine retouch present. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962). Middle Archaic.

Mud Creek - (N=12)This is a medium-sized hafted biface with excurvate blade edges, incurvate to straight tapered shoulders, an incurvate expanding to angular convex haft element, and an excurvate to straight base.



Flaking is by non-patterned percussion, with retouch present on some examples. The cross-section is biconvex (Cambron and Hulse 1960, 1964, 1975; Ensor 1980). Middle Woodland.

Plevna - (N=6)This is a medium to large hafted biface with straight to excurvate blade edges, incurvate to straight barbed shoulders, a straight incurvate expanding haft element, and an excurvate base.

Flaking is by percussion, with secondary retouch. The cross-section is biconvex. The base is usually ground (Cambron and Hulse 1964, 1975; Ensor 1980). Early Archaic.

Quad - (N=1)This is a medium-sized lanceolate hafted biface with recurvate blade edges and a recurvate base.

Flaking is by percussion, with short, abrupt retouch along all edges. The base and haft element are usually ground. The cross-section is flattened to biconvex (Bell 1960; Cambron and Hulse 1964, 1975; Lewis 1960; Soday 1954). Paleo-Indian.

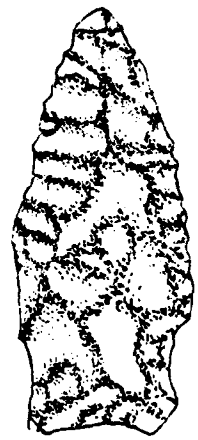
Residual Side-Notched - (N=1)This small to medium-sized hafted biface with "side notches" does not conform to established types. Early Archaic.

Residual Stemmed - (N=293)This group of small to large hafted biface with unnotched stems does not conform to any of the recognized categories. Late Archaic.

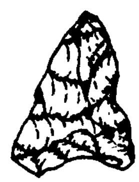
Residual Triangular - (N=23)This group of small to medium-sized triangular hafted bifaces without "stems," does not conform to any of the established categories. Middle Archaic.

Savannah River - (N=4)This is a large hafted biface with excurvate blade edges, straight tapered to horizontal shoulders, a straight parallel to contracting haft element, and a straight to incurvate base.

Flaking is probably by hard hammer and soft hammer percussion, with some retouch. The cross-section is biconvex Cambron and Hulse 1964, 1975; Coe 1959, 1964). Late Archaic.



Small Unfinished Triangular - (N=31)This is a preform for a small triangular hafted biface. Percussion flaking leaves widely spaced flake scars and an uneven, rough bifacial edge. The generally triangular forms have no secondary retouch. The cross-section is thickened to biconvex (this volume).



Swan Lake - (N=2)This is a small hafted biface with straight, excurvate, or incurvate blade edges, incurvate to straight tapered shoulders, an incurvate expanding haft element, and an excurvate to straight basal edge.

Flaking is probably by light soft hammer percussion, with secondary pressure retouch. The cross-section is biconvex to median ridged (Cambron and Hulse 1960, 1964, 1975; Dejarnette, Kurjack, and Cambron 1962). Middle Woodland.

Sykes-White Springs - (N=142)This is a medium-sized hafted biface with straight to excurvate blades, incurvate tapered to straight horizontal shoulders, a straight to incurvate expanding haft element, and a straight base. The haft was formed by removing small corners from the proximal portion of the biface.

Flaking is by percussion, with minimal retouch. The cross-section is biconvex (Cambron and Hulse 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Lewis and Lewis 1961). Middle Archaic.

Tombigbee Stemmed - (N=9)This is a medium-sized hafted biface with straight to excurvate blade edges, straight to excurvate tapered shoulders, a straight parallel to contracting haft element, and a straight to excurvate base.

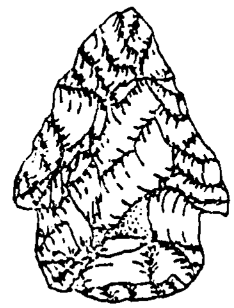
Flaking is probably by hard hammer and soft hammer percussion with some secondary pressure retouch. The cross-section is biconvex (Ensor 1980). Middle Woodland.

Unidentifiable Projectile Point/Knife Distal Fragment - (N=1714)This is a fragment of a projectile point/knife that is derived from the distal portion. No metric data were recorded for this category.

Unidentifiable Projectile Point/Knife Medial Fragment - (N=1259)This is a fragment of a projectile point/knife that is derived from the medial section. No metric data were recorded for this category.

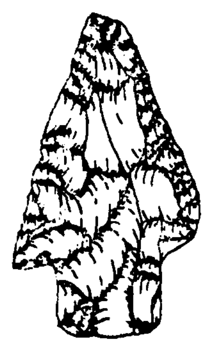
Unidentifiable Projectile Point/Knife Proximal Fragment - (N=1091)This is a fragment of a projectile point/knife that is derived from the proximal section. No metric data were recorded for this category.

Vaughn - (N=10)This is a medium-sized hafted biface with straight blade edges, incurvate tapered shoulders, an incurvate concave to straight expanding haft element, and a straight to excurvate base.



All specimens are made of Tallahatta Quartzite. Flaking is by percussion, with little retouch evident. The cross-section is biconvex (Atkinson 1974; Ensor 1980). Middle Archaic.

Wade - (N=3)This is a medium-sized hafted biface with straight to excurvate blade edges, straight to incurvate barbed shoulders, a straight parallel to expanding haft element, and a straight to incurvate base.



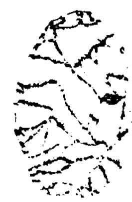
Flaking is most likely by both hard and soft hammer percussion, with secondary retouch present along the blade and haft element. The cross-section is biconvex to flattened (Cambron and Hulse 1960, 1964, 1975; Dejarnette, Kurjack, and Cambron 1962; Ensor 1980; Faulkner and McCollough 1973; Keel 1978). Late Archaic.

Biface Blades: After Futato (1980), the technological placement of these categories falls between that of the Projectile Point/Knife categories and the Preform 2 categories. They are late-stage preforms which appear ready for final modification into a hafted biface form. The specimens are generally bifacially thinned and retouched, with unmodified haft elements. The individual categories are determined by morphology and by the nature of the blanks on which specimens were made. Thus, a biface blade could be made on a flake, a cobble, or perhaps another piece of material. Due to the extensive retouch present on most specimens, only those artifacts made on flakes could possibly be determined as to the specific blank used in its manufacture. Cobble blanks could not be detected.

The following categories are based, in part, on recognizable flake blanks and indeterminate (other) blanks. The measurement summary statistics for bifaces are presented in Table 4.3.

Category 1 Ovoid Biface Blade - Flake - (N=20)This is a thinned, retouched, ovoid biface made on a flake. Bifacial edges are regular and unflaked surfaces are rare. A single edge segment is represented, no separate basal edge is present.

Category 2 Ovoid Biface Blade - Other - (N=27)This category is technologically similar to Biface Category 1, except the nature of the blank is indeterminable. The size range is similar to that of Biface Category 1.



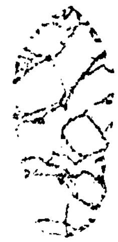
Category 3 Triangular Biface Blade - Flake - (N=48)This is a thinned, retouched triangular biface with two symmetrical blade edges and a base. The edges are usually straight to parallel excurvate or incurvate. The base is ordinarily the maximum width of the biface, approximately 20 to 30% of the length. This category is made on flakes and, along with Biface Category 4, represents numerically the most prevalent biface category. The size range is from small to large.

Category 4 Triangular Biface Blade - Other - (N=126)This category is formally and technologically similar to Biface Category 3, except that the nature of the original blank is indeterminable. The size range is similar to that of Biface Category 3.

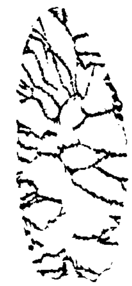
Category 5 Narrow Triangular Biface Blade - Flake - (N=11)This is a narrow-bladed biface which is similar to the triangular biface blade categories above. The distinctive quality is the extremely narrow basal edge which is only about 10% of the length. This biface is made on a flake. The size range is from small to large.

Category 6 Narrow Triangular Biface Blade - Other - (N=12)This category is formally and technologically similar to Biface Category 5. The nature of the original blank, however, is indeterminable. The size range is similar to that of Biface Category 5.

Category 7 Expanding Triangular Biface Blade - Flake - (N=9)This is similar to the triangular biface blade categories above. The blade edges are excurvate, so that the distance from the base to the widest portion of the blade is greater than the maximum blade width.



Category 8 Expanding Triangular Biface Blade - Other - (N=4)This category is formally and technologically similar to Biface Category 7. The nature of the blank is indeterminable. The size range is similar to that of Biface Category 7.



Category 9 Broad Based Triangular Biface Blade - Flake - (N=1)This category is similar to the other triangular biface blade categories except that the basal width is at least 65% of the length. The artifact is made on a flake.

Category 10 Broad Based Triangular Biface Blade - Other - (N=17)This category is similar to Biface Category 9 except that the nature of the original blank is indeterminable. The size range is similar to that of Biface Category 9.

Category 11 Biface Blade Proximal Fragment - (N=180)This is a biface blade identifiable only as the proximal portion. No metric data were recorded for this category.

Category 12 Biface Blade Medial Fragment - (N=147)This is a biface blade identifiable only as the medial portion. No metric data were recorded for this category.

Category 13 Biface Blade Distal Fragment - (N=219)This is a biface blade identifiable only as the distal portion. No metric data were recorded for this category.

Category 14 Biface - Other - (N=13)This is a biface that does not conform to an established biface category.

<u>Category</u> <u>15</u> Rehafted Biface Fragment - (Recycled) - (N=27)This is a broken biface showing secondary haft modification, such as a notched medial or distal section.

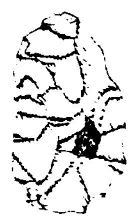
Preforms: In Futato's system (1980), preforms are broken down into two major groupings: Preform 1 and Preform 2. These are early middle-stage preforms which are antecedant to the biface blade and projectile point/knife categories in a technological trajectory. The nature of the original blank is more easily determined on these specimens due to the lack of intensive retouch that obscures qualities on the biface blade categories.

Like the biface blades, individual categories are determined by aspects of form and by the nature of the blanks on which specimens were made. A Preform 1 and a Preform 2 could be made on either a flake or a cobble, rarely on another blank.

The following categories are based partially on recognizable flake blanks, cobble blanks, and indeterminate (other) blanks. The primary separation is based on general size, thickness, and the presence or absence of secondary flaking. The measurement summary statistics for preforms are presented in Table 4.4.

Category 1 Preform 1 - Cobble - (N=57)This is a thick, roughly flaked, ovoid to triangular biface form. It is made on a cobble. There is minimal or no secondary flaking. Unflaked surfaces are usually present on both surfaces. The size ranges from small to large.

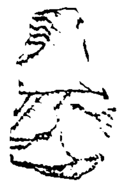
Category 2 Preform 1 - Flake - (N=164)This category is similar to Preform Category 1, except that it was made on a flake. The size range is similar to that of Preform Category 1.



Category 3 Preform 1 - Indeterminate - (N=252)This category is similar to the above two preform categories. The only difference is that the nature of the original blank has been obscured through flaking.

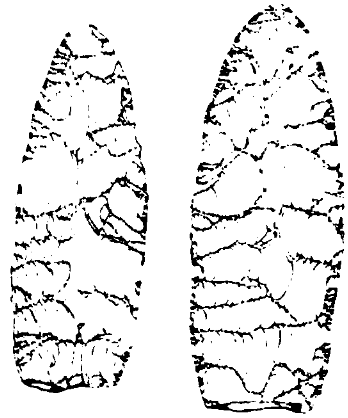
Category 4 Preform 2 - Cobble - (N=9)This category is similar to the above categories but possesses some secondary flaking. Consequently, it tends to be thinner, with a more regular outline. Unflaked surfaces are present at times, but are less common than in the above groups. The size range is from small to large.

Category 5 Preform 2 - Flake - (N=193)This category is similar to Preform Category 4, except that the preform is made from a flake. The size range is similar to the above category.



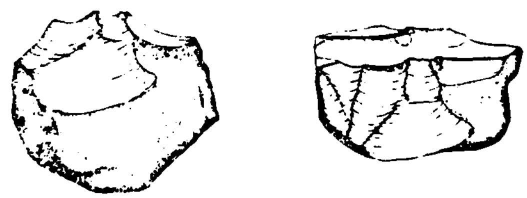
Category 6 Preform 2 - Indeterminate - (N=392)This category is similar to Preform Categories 4 and 5, except that the nature of the original blank is indeterminable.

Category 7 Quarry Blades - (N=12)This is a bifacially thinned, ovoid to triangular preform made on a primary flake blank (Bradley 1975). Often, remnants of the striking platform of the large flake or blade on which the biface was chipped are visible. These were probably produced at quarry sites. The size is usually large. These specimens differ from Triangular Biface Blades in proportion of base to blade length, shape of blade, and size.

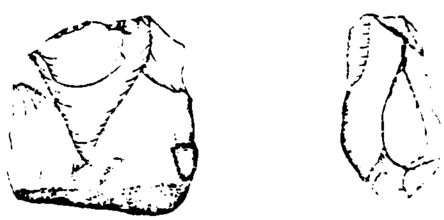


Cores: Futato (1980) describes cores in his system as possibly representing the initial flaked stage in the model of biface production. Most cores are made on Tuscaloosa gravels (Camden chert), with rare examples manufactured on Bangor and Ft. Payne chert. Cores could produce flakes for use as tools or flake blanks for the production of tools in the initial stage in biface manufacture. The examination of flaking qualities of cherts could have resulted in some of these cores. Futato (personal communication 1980) has devised a system for subdividing the core categories for the purpose of technological and macromorphological distinctions. These determine whether the flaking is predominately bifacial or unifacial, the amount of surface area showing flake scars, and their placement on the core. The measurement summary statistics for cores are presented in Table 4.5.

Category 1 90° Unifacial Core - (N=62)This is a core which is flaked unifacially on approximately 1/4 of the edge of the cobble or other material. Flake scars are generally large, massive, and originate from either natural (cortex) or prepared (flaked) platforms.



Category 2 90° Bifacial Core - (N=3)This is a core which is flaked bifacially around approximately 1/4 of the edge of the cobble or other material. Flake scars are generally large, massive, and originate from prepared platforms or natural platforms.

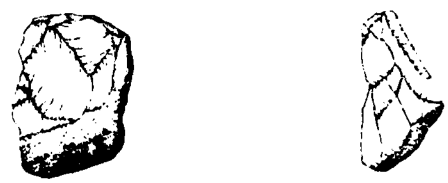


Category 3 180° Unifacial Opposing Core - (N=13)This is a core which is flaked unifacially on approximately 1/2 of the edge of the cobble or other material. The flaking is on opposing sides or ends around the margin of the core. The flake removals may be large or small, massive or diminutive.

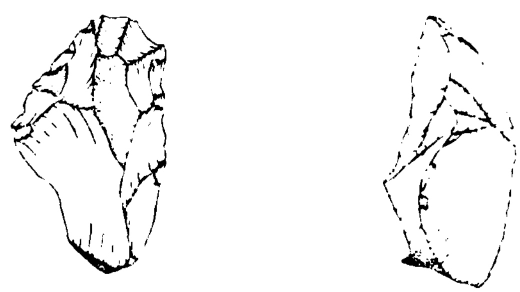
Category 4 180° Bifacial Opposing Core - (N=2)This is a core which is flaked bifacially on approximately 1/2 of the edge of the cobble or other material. The flaking occurs on opposite ends or sides. The specimen must have at least one bifacial edge segment to be considered bifacial opposing. Flake scars vary from massive to diminutive.

Category 5 180° Unifacial Adjacent Core - (N=60)This is a core which is flaked continuously (unifacially) around approximately 1/2 of the edge of the cobble or other material. Flaking is variable, but scars are usually massive.

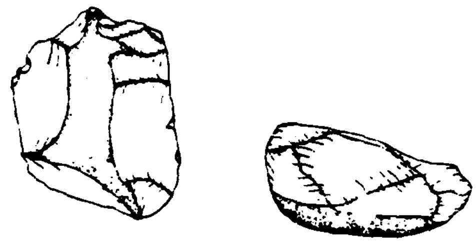
Category 6 180° Bifacial Adjacent Core - (N=15)This is a core which is flaked continuously *(bifacially) around approximately 1/2 of the edge of* the cobble or other material. Flaking is variable, but scars are similar to Core Category 5.



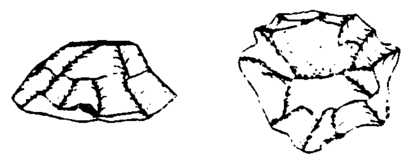
Category 7 270° Unifacial Core - (N=26)This is a core which is flaked around 3/4 of one face of the cobble or other material. The flaking is usually continuous, although small unflaked portions may exist. An occasional bifacial segment may be present, however, the majority of the flaking is unifacial. Flake scars are generaly massive, but small scars occur.



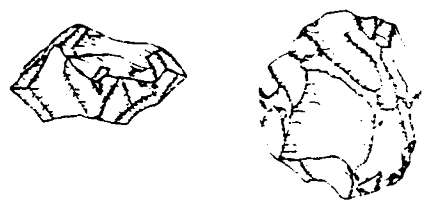
Category 8 270° Bifacial Core - (N=9)This category is similar to Core Catgory 7 except *that the flaking* is predominately bifacial around approximately 3/4 of the edge. Flaking is similar to Core Category 7.



Category 9 360° Unifacial Core - (N=19)This is a core which is flaked predominately on one face (unifacially) around the entire periphery of a cobble or other material. Flake scars are generally massive.

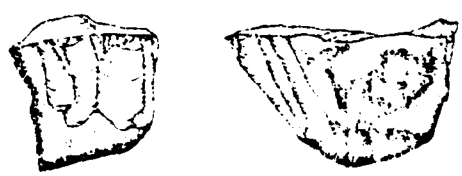


Category 10 360° Bifacial Core - (N=17)This category is similar to Core Category 9 except that the mode of flaking is primarily bifacial. Flake scars are similar to those of Core Category 9.



Category 11 Bipolar Core - (N=15)This is a special case core produced through a bipolar flaking technique. Special attributes diagnostic of this practice include opposed battered and crushed platforms and blade-like scar removals running the entire length of the core.

Category 12 Blade Core - (N=1)This is a special case core possessing negative blade scar removals originating from one or more platforms. Evidence of platform preparation may be exhibited by crushed and ground platform edges or transversely flaked platforms. Artifacts in this category are generally greater than 5 cm in length.



Category 13 Microblade Core - (N=10)This category is similar to Core Category 12 except that artifacts in this category are smaller, generally less than 5 cm in length.

Category 14 Core Fragments - (N=425)This is a section of a core that has been broken to the extent that more precise classification is precluded. No metric data were recorded for this category.

Category 15 Core - Other - (N=49)Cores in this category do not conform to on. of the above categories.

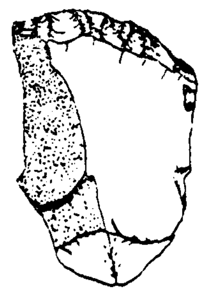
Scrapers: Unlike the preceding categories of Core, Preforms, Biface Blade, and Projectile Point/Knife, the scraper categories are not yet placed into a distinctive technological trajectory. These categories are based on macroscopic criteria such as edge morphology, position of the working edge, and nature of the blank. Since most scraper categories are apparently based on a flake technology, the various sub-categories of scrapers refer to unifacial or bifacial retouch and its position with regard to the bulbar axis of the flake. In cases where the bulbar axis or the nature of the blank was not determinable, the technological distinction is based simply on the long axis of the tool.

The macroscopic, subjective determination of edge angle and its synonomy with scraping was in many cases obviously skewed (Ahler, Appendix III). However, lacking a better system for detecting scraper usage in this stage of the analysis, Wilmsen's (1968) inferences concerning Paleo-Indian scrapers were taken as the best sorting criteria.

The following is a list of the 28 scraper categories used in the preliminary analysis. The measurement summary statistics for scrapers are presented in Table 4.6.

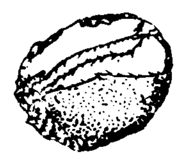
Category 1 Uniface Side Scraper on Blade/Blade-Like Flake - (N=21)This is a steeply retouched uniface tool possessing straight or convex working edges on a blade or blade-like flake. The angle of retouch varies from 55° to 90°, but most subjectively fall between 60° and 70°. The working edge is positioned parallel to the axis of percussion when present. In other cases, where the axis of percussion is not determined, the working edge is positioned parallel to the long axis of the piece. Retouch flakes are generally small and closely spaced.

Category 2 Uniface End Scraper on Blade/Blade-Like Flake - (N=7)This category is like Scraper Category 1, however, the working edge is positioned transverse to rather than parallel with the axis of percussion. Where the axis of percussion is indeterminable, the working edge is positioned transverse to the long axis of the piece. Flaking is similar to Scraper Category 1.



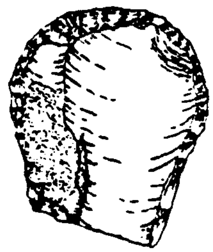
Category 3 Uniface Side-End Scraper on Blade/Blade-Like Flake - (N=124)This category is similar to the above categories except that unifacial retouch is present both parallel and transverse to the axis of percussion. If the axis is not determined, then retouch is present on at least two adjacent edge segments. Flaking is similar to the above categories.

Category 4 Uniface Side Scraper on Expanding Flake - (N=60)This category is similar to Scraper Category 1, the only difference being the morphology of the original flake blank. This category is made on an expanding flake, that is, the flake expands from the bulbar end to the end opposite the bulb. The edges of the flake are straight to slightly irregular. Flaking is similar to Scraper Category 1.

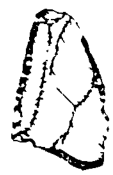


Category 5 Uniface End Scraper on Expanding Flake - (N=79)This category is similar to Scraper Category 2 except that it is made on a flake which expands from the bulbar end to that opposite the bulb of percussion. Flaking is similar to Scraper Category 1.

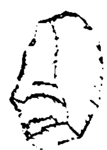
Category 6 Uniface Side-End Scraper on Expanding Flake - (N=43) This category is similar to Scraper Category 3. The distinction is in the expanding flake blank versus the blade-like blank. Flaking is similar to that category.



Category 7 Uniface Side Scraper on Other Flake - (N=156)This category is similar to Scraper Categories 1 and 4 above except that the morphology of the flake-blank on which the scraper is made is either indeterminate or amorphous. Flaking is similar to the other scraper categories.



Category 8 Uniface End Scraper on Other Flake - (N=107)This category is similar to Scraper Categories 2 and 5. The distinction is in the indeterminate or amorphous nature of the flake-blank. Flaking is similar to Scraper Category 1.



Category 9 Uniface Side-End Scraper on Other Flake - (N=64)This category is similar to Scraper Categories 3 and 6. The scraper distinction is in the amorphous or indeterminate nature of the flake-blank. Flaking is like that of Scraper Category 1.

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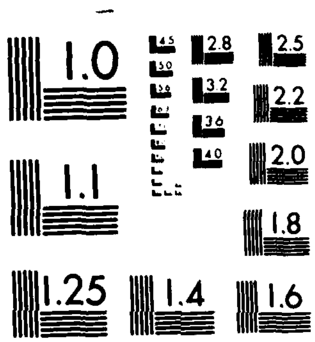

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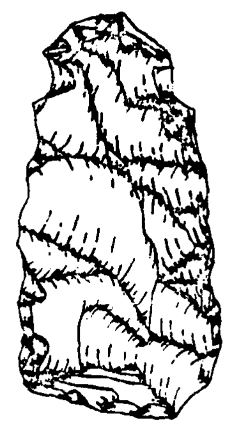
Category 10 Uniface End Scraper on Thermal Spall - (N=4)This category is similar to Scraper Categories 2, 5, and 8, except that it is made on a thermal spall. Flaking is also similar to those categories.

Category 11 Uniface Side Scraper on Thermal Spall - (N=5)This category is similar to Scraper Category 1, 14, and 7 except that it is made on a thermal spall. Flaking is also similar to those categories.

Category 12 Uniface Side-End Scraper on Thermal Spall - (N=1)This category is similar to Scraper Categories 3, 16, and 9 except that the original blank is a thermal spall. Flaking is also similar to those categories.

Category 13 Biface Hafted End Scraper - (N=9)This is a bifacially worked tool made on a flake. The working edge is transverse to the bulbar axis. The bulbar end often retains remnants of the striking platform or bulb of percussion, however, it is usually bifacially modified to facilitate hafting. The edge angle of the working edge is generally steep, between 50° and 75°. Flaking is similar to other end scraper categories with retouch common along the haft and working edge.

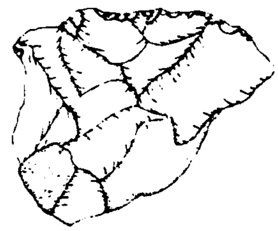


Category 14 Uniface Cobble Scraper - (N=6)This is a unifacially retouched cobble which has been modified on one or more margins to produce working edges of various lengths. Edge angle is generally between 50° and 75°. Flaking is variable, with both large percussion scars and fine retouch present.

Category 15 Biface Cobble Scraper - (N=1)This category is similar to Scraper Category 14 except that the predominate mode of flaking is bifacial.

Category 16 Scraper on Biface (Recycled) - (N=48)This is a bifacially retouched tool, either whole or fragmentary, which possesses a steeply retouched edge, generally greater than 50° but less than 75°. It is usually made from a preform, biface blade, or projectile point/knife fragment. Flaking is generally light percussion or pressure retouch.

Category 17 Scraper on Core (Recycled) - (N=10)This is a core that has a steeply retouched unifacial or bifacial edge, generally between 50° and 75°. This is a "core tool," which probably also functioned as a flake source before its scraper use. Flaking is generally light percussion retouch.

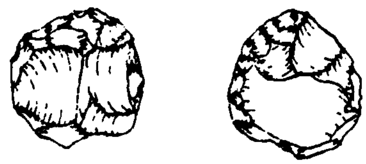


Category 18 Notched Flake/Spokeshave - (N=96)This is an artifact that possesses a steeply retouched concavity or notch on one edge. It is usually made on a flake. The flaking is probably pressure retouch.

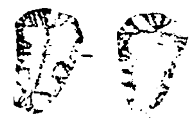
Category 19 Unidentifiable Scraper Fragment - (N=101)This is a steeply retouched flaked stone fragment that is too fragmentary for positive identification. No metric data were taken for this category.

Category 20 Scraper - Other - (N=16)This is a steeply retouched unifacial or bifacial tool that has a distinct morphology but does not fit other scraper category descriptions. Flaking is variable.

Category 21 Ovoid Biface Scraper - (N=2)This is a steeply retouched ovoid biface which does not conform to other scraper categories. Flaking is generally light percussion and pressure retouch.

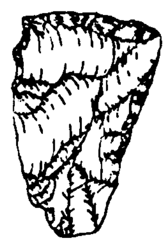


Category 22 Biface Scraper on Flake - (N=14)This is a bifacially retouched flake. The working edge is steeply retouched. Flake scars are generally small and closely placed.



Category 23 Graver/Scraper - (N=6)This is a uniface or biface tool possessing both a steeply retouched edge and a short, thin projection. The projection is usually unifacially flaked and has a sharp tip. Flaking is variable, mostly light percussion and pressure.

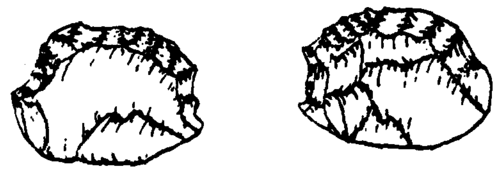
Category 24 Uniface Hafted End Scraper - (N=7)This is a unifacially worked flake tool with a steep edge transverse to the long axis of the flake. The lateral edges of the tool have usually been flaked to facilitate hafting. The retouch is probably by light percussion and pressure.



Category 25 Notched Biface Side Scraper - (N=3)This is a bifacially worked tool with a steep lateral working edge and a small, narrow notch in the blade margin. Flaking appears to be light percussion or pressure.

Category 26 Notched Flake/Spokeshave (Recycled) - (N=3) This is an artifact possessing a steeply retouched concavity or notch on an edge margin. It is usually on a biface.

Category 27 Ovoid Biface Scraper (Recycled) - (N=1)This is a steeply retouched ovoid tool which is made on a recycled biface. Flaking is similar to Scraper Category 26.



Category 28 Hafted End Scraper (Recycled) - (N=13)This is a steeply retouched tool, similar to Category 13, possessing a working edge transverse to the bulbar axis. These are made on bifaces, most often proximal portions of projectile point/knives. Flaking appears to be light percussion and pressure.

Drills, Perforators, etc.: This is a grouping of specimens based on macromorphological clustering of formal attributes. The names given are functional in nature, but are used here only as a traditional label for such implements, not as a strict indicator of use. However, Ahler (Appendix III) notes that the highest degree of synonomy between morphology and function exists within this grouping. The distinction between drills and perforators is subjective, based on thickness, bit length, evidence of hafting, etc.

These tools do not fit within an established technological trajectory, although some categories represent drills which are recycled from projectile point/knives. Future work should establish the reliability of many of the proposed categories used in Phase I.

A total of 14 drill/perforator categories, which are described below, were used in the preliminary analysis. The measurement summary statistics for these categories are presented in Table 4.7.

Category 1 Shaft Drill - (N=70)This is a long, narrow, ovoid to cylindrical tool possessing a bit. It generally possesses no haft modification. Crushing along the bit possibly indicates rotary use. Flaking is presumed to be light percussion and pressure.

Category 2 Expanding Base Drill - (N=116)This category is like Drill Category 1 except the proximal section, which shows evidence for hafting, is expanded.

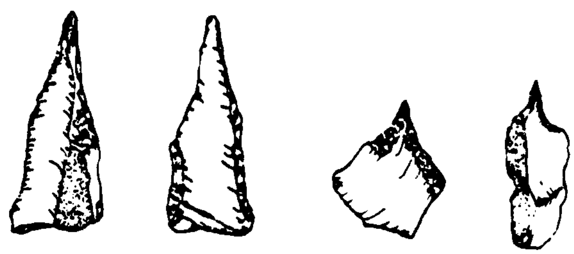
Category 3 Stemmed Drill (Recycled) - (N=118)This category is similar to Drill Category 2, except that it appears to be made on a reworked projectile point/knife with the proximal portion being the only portion which has not been reworked.

Category 4 Drill Fragment - Distal - (N=289)This is a thick, rod-like biface which has been broken so that evidence of hafting or overall morphology may not be determined. It presumably represents the working edge of the drill. Flaking is similar to the other drill categories.

Category 5 Drill Fragment - Medial - (N=170)This category is similar to the other drill categories except that it represents a portion of a drill broken from between the distal and proximal ends.

Category 6 Reamer - (N=20)This is a bifacial tool with a thick, rounded to triangular cross-section. A reamer is thicker and generally larger with a more triangular cross-section than a drill. The orientation of the bit to the main body of the tool may be such as to preclude hafting and use in a hafted rotary fashion. Most were probably hand held. Flaking is generally more widely spaced, with larger flake scars than drills.

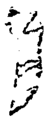
Category 7 Perforator - (N=85)This category is separated from drills and reamers on the basis of its diminutive size and the shape and orientation of the working edge. It has a thinner, shorter bit, less suitable for drilling. Many are unifacially retouched from the ventral surface of a flake, apparently by pressure.



Category 8 Graver - (N=49)This is a small stone tool which exhibits one or more small, short, sharp, manufactured projections. It is usually made on a flake. Flaking is probably pressure retouch.

Category 9 Microlith - (N=58)This is a small flake or blade tool which is usually characterized by fine pressure retouching along one or more edges. Many of these may be small drills.

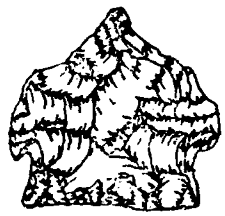
Category 10 Denticulate - (N=10)This is a flake which has repeated, contiguous notches separated by ridges giving a saw-like appearance to the edge. This was probably produced by pressure flaking.



Category 11 Other -VOID

Category 12 Microperforator - (N=19)This category is similar to Drill Category 9 except that it is generally smaller.

Category 13 Reamer (Recycled) - (N=8)This is a bifacial tool, thick, triangular in cross-section, and rod-like, which is recycled on a biface. Flaking is similar to Drill Category 6.

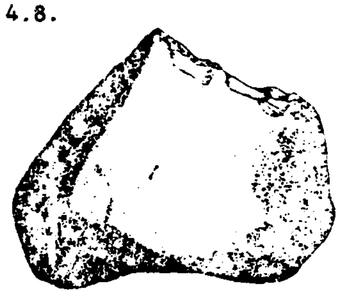


Category 14 Perforator (Recycled) - (N=15)This is a bifacial tool similar to Drill Category 7 except that it is made on a biface instead of a flake.

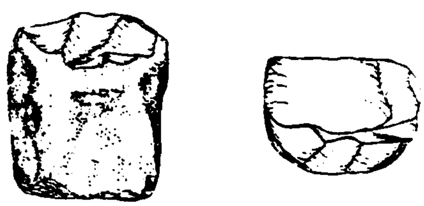
Other Uniface and Biface Tools: This grouping of stone tools represents a catch-all of other implements which are not designated to a lithic trajectory. Many of these have functional names, but like scrapers and drills, these are used because of their traditional association with these macromorphological categories. Technological distinctions such as unifacial or bifacial retouch and whether the tool was made on a cobble or flake are present. As Collins and Ahler have noted in their assessment of the Phase I lithic system (Appendix III), a large amount of variability has not been captured in the pigeon holes used. The Phase III analysis will begin to sort this out and place fragmentary specimens into their proper techno-functional categories. Much of the problem concerning these categories has to do with the time and expertise involved in the identification of the numerous specimens. An appropriately selected sample from these collections should make the determination of this variability feasible.

Some 21 categories of other uniface and biface tools were used during the Phase I analysis. The measurement summary statistics for these categories are presented in Table 4.8.

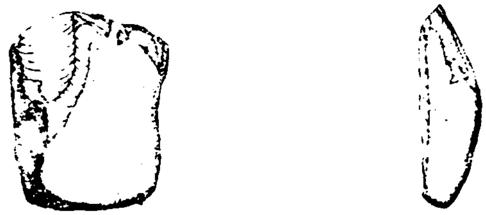
Category 1 Uniface Chopper - (N=26)This is a large unifacially flaked tool with one or more steep, broad working edges. Flaking appears to be primarily hard hammer percussion, with practically no secondary retouch.



Category 2 Biface Chopper - (N=72)This category is similar to Other Uniface and Biface Tool Category 1 except that the retouch is primarily bifacial.



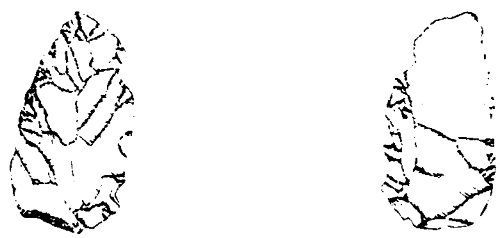
Category 3 Uniface Adze - (N=13)This is an elongate, transverse edge tool. The angle of the working edge is generally steep, from 50° to 75°, and the end opposite the working edge appears to be modified for hafting. The working edge morphology is generally concave to convex when viewed laterally. Flaking appears to be both hard hammer percussion and soft hammer-pressure retouch, primarily along the working edge.



Category 4 Biface Adze - (N=37)This category is similar to Other Uniface and Biface Tool Category 3 except that the tool is bifacially flaked.

Category 5 Uniface Flake Knife - (N=126)This tool is made on a flake. Unifacial retouching, probably by light percussion or pressure, has created one or more acute edges. The edge angle is generally less than 45°.

Category 6 Biface Flake Knife - (N=117)This category is similar to Other Uniface and Biface Tool Category 5. The distinction is in the bifacial retouching as opposed to the unifacial retouching.



Category 7 Uniface Cobble Knife - (N=10)This category is similar to Other Uniface and Biface Tool Category 5 except that the tool is flaked on a cobble.

Category 8 Biface Cobble Knife - (N=3)This category is similar to Other Uniface and Biface Tool Category 6 except that the tool is flaked on a cobble.

Category 9 Biface Digging Implement - (N=17)This is a large, percussion flaked tool usually made on ferruginous sandstone or conglomerate. It has a broad, rough, bifacial working edge that is usually transverse to the long axis of the tool. The shape, flaking, and often wear patterns suggest a digging function for these large tools.

Category 10 Unidentifiable Chipped Stone Fragment - (N=10,917) This is a unifacially or bifacially flaked fragment which is too broken for precise classification. No metric data are available for this category.

Category 11 Other - (N=21)This is a unifacial or bifacial tool which does not conform to the other established categories.

Category 12 Wedge - (N=8)This is a flaked stone tool with a steep, transverse working edge. It generally has a thick cross-section. Heavy battering and crushing are in evidence on one or both ends. Flaking is variable with little secondary retouch.

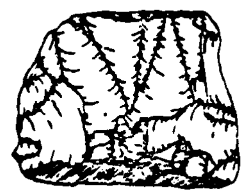
Category 13 Chipped Axe - (N=3)This is a bifacially flaked tool with a transverse bit. There is evidence for hafting parallel to the working edge(s). Flaking is generaly massive, with some small retouch flakes present.

Category 14 Chopper/ Hammerstone - (N=16)This category combines a large unifacial or bifacial edge which has been steeply flaked by percussion with an area of localized pecking, battering, or crushing.

Category 15 Chisel - (N=25)This is a uniface or biface tool with a steep, transverse working edge generally longer than it is wide and thick in cross-section. It usually shows battering along the working edge in the form of edge crushing and step flaking. Flaking is generally percussion, with minimal secondary retouch.

Category 16 Burinated Biface (Recycled) - (N=6)This is a biface which exhibits a sharp pointed appearance due to the intersection of an edge of the biface with a flat, fractured surface. The sharp point or edge usually shows wear in the form of blunting, rounding, or crushing.

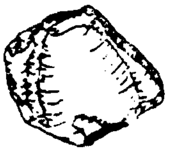
Category 17 Adze/Chisel - (N=9)This category is similar to Other Uniface and Biface Tool Categories 3 and 4. The working edge of this group is also a transverse bit that lies perpendicular to the long axis of the tool, but is not as formalized and distinct.



Category 18 Biface Flake Knife/Spokeshave - (N=2)This category combines the attributes of Category 6 above with a narrow, flaked concavity along the edge. Flaking is probably light percussion and pressure.

Category 19 Biface Knife on Thermal Spall - (N=4)This is a thermal spall which exhibits acute bifacial retouch and an edge angle of 45° or less.

Category 20 Piece Esquille - (N=17)This is a bipolarly produced wedge to rectangular shaped core tool characterized by concave working edges and opposed battered platforms. Flaking was probably by hard hammer percussion.



Category 21 Piece Esquille on Biface (Recycled) - (N=5)This is a biface fragment which has been bipolarly retouched, i.e., it shows battering on opposing ends that forms a chisel-shaped edge.

Ground Stone

The grouping of stone tools into a ground stone category is done primarily on the basis of technology and raw material. Tools which show evidence of manufacture by pecking, grinding, and polishing are generally composed of sandstone, hematite, limonite, conglomerate, or occasionally chert cobbles.

Most tool categories are self-descriptive and those employing function are utilized in the same manner as previous functional designations. Categories with multi-functional designations indicate that we recognize multiple-use tools within the system. The functional diversity has not been measured or quantified in this macromorphological system.

A reduction model of ground stone tool manufacture and use has not been generated during the preliminary analysis. One problem encountered during the analysis was the separation and inclusion of a tool under a flaked stone or ground stone heading. This was due to the presence of indistinct manufacturing attributes when material such as ferruginous sandstone or conglomerate was used. Often these materials contained high amounts of silica which enabled the prehistoric knapper to actually "flake" sandstone by a percussion technique. This indicates that we may have a combination of flaked, pecked, and ground stone technologies involved in the manufacture of certain stone tool categories. In cases of doubt, the predominant mode of production was taken as the general category heading under which the specimen was placed.

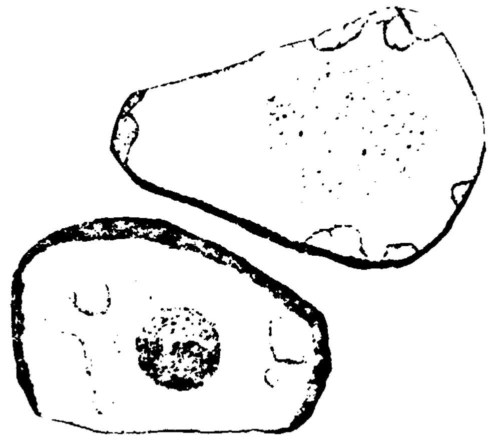
It is evident from the variability represented within the ground stone tool categories, along with the presence of large quantities of unworked sandstone on the sites, that this was an important category of materials to the inhabitants. Models of ground stone technology and use should be developed during Phase III to augment the flaked stone technology and use models.

Some 40 ground stone tool categories were used during the Phase I analysis and are presented below: The measurement summary statistics for ground stone are presented in Table 4.9.

<u>Category</u> <u>1</u> Hammerstone: (N=190) This category consists of specimens which have one or more localized areas of battering or crushing, usually along an edge margin. Cobbles are the usual objects which exhibit these attributes.

Category 2 Anvilstone: (N=13)This is a piece of stone which has been pecked and battered to form irregular depressions and troughs on a tabular surface. The surface of the stone has a general pecked appearance.

Category 3 Pitted Anvilstone: (N=82)This category is similar to Ground Stone Category 2. The distinction is in the depressions, which are well-formed and conical.



Category 4 Hammer/Anvilstone: (N=10)This is a stone showing one or more localized areas of battering on edges in conjunction with irregular pitted and pecked surfaces.

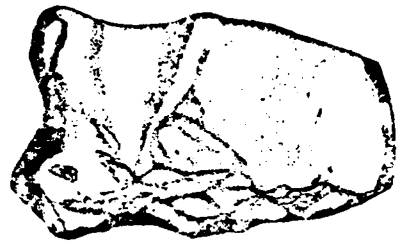
Category 5 Abrader: (N=56)This is a tool that shows localized areas of grinding and smoothing. The wear may be in the form of deep, elongate grooves, or in broad shallow expanses of abrasion.

Category 6 Muller: (N=48)This is a medium to large grinding stone which has at least one flat to convex tabular surface that has been smoothed and ground.

Category 7 Mortar: (N=37)This is a medium to large grinding stone which has at least one large shallow to deeply concave smoothed, ground surface. The wear may include extensive grinding, pitting, and pecking.

Category 8 Pestle: (N=3)This category is similar to Ground Stone Category 6 except that the tool has a distinctive "bell shaped" appearance. The flat, convex, grinding surface is attached to a long, smooth extension.

Category 9 Grooved Axe: (N=3)This tool exhibits a broad, transverse bit and grooves for hafting that occur parallel to the working edge on both faces of the axe.

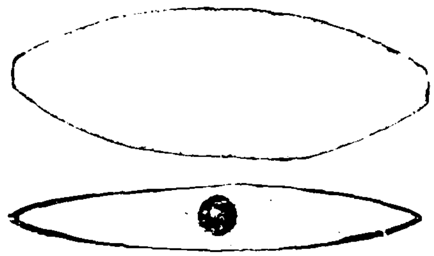


Category 10 VOID

Category 11 Celt: (N=3)This is a lenticular cross-sectioned tool which exhibits a biconvex transverse bit. This bit is usually opposite a tapered poll or butt section. It is characteristically highly polished and made of greenstone.

Category 12 Gorget: (N=5)This is a highly polished, thin, tabular artifact which has one or more drilled holes near the center for purposes of attachment. It may be serrated along the margin.

Category 13 Atlatl Weight: (N=22)This is a highly ground and polished object, usually with a central hole drilled longitudinally to facilitate hafting. Various geometric shapes occur.



Category 14 Discoidal: (N=2)This is a circular to oval shaped biconvex piece of stone which has been pecked and ground into shape.

Category 15 Bead: (N=38)This is a circular disc, tubular, or zoomorphic shaped object which is highly ground and polished. It has a drilled perforation for purposes of attachment.

Category 16 VOID

Category 17 Hoe Chip: (N=1)This is a flake that is highly polished on the dorsal surface and presumably results from resharpening or attrition of the working edge of a digging implement.

Category 18 Steatite Sherd: (N=5)This is a fragment from a steatite vessel. It is fairly thick and may retain chisel marks or other traces of manufacture on the outer surface. The sherds are waxy or "soapy" to the touch.

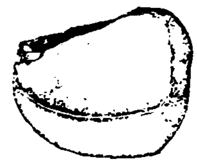
Category 19 Sandstone Sherd: (N=11)This category is similar to Ground Stone Category 18 except that the raw material from which the vessel is manufactured is sandstone.

Category 20 Worked Hollow Sandstone Concretion: (N=6)This is a small, hollow, globular sandstone concretion which has been broken open. The exposed edges and interior are often ground to produce the globular cup-like artifact.

Category 21 Ground Limonite: (N=90)This is an amorphous piece of limonite which has areas of grinding and smoothing on the surface.

Category 22 Ground Hematite: (N=111)This category is similar to Ground Stone Category 21 except the raw material is hematite.

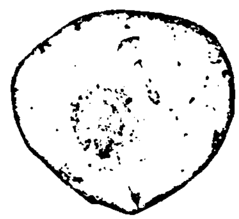
Category 23 Edge Ground Cobble: (N=2)This is a cobble which is extensively ground along the margin.



Category 24 Unidentifiable Ground Stone: (N=3,783)This is a piece of ground, smoothed, or pecked stone that is too fragmented to allow identification.

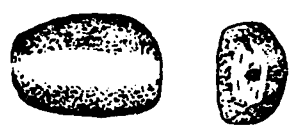
Category 25 Ground Flake: (N=321)This is a flake (usually of ferruginous sandstone or conglomerate) which is ground and smoothed on the dorsal surface. It is similar to Ground Stone Category 17 except it lacks the characteristic high polish of a hoe chip.

Category 26 Muller/Pitted Anvilstone: (N=22)This category combines the attributes of Ground Stone Categories 3 and 6; in essence, it is a combination tool.



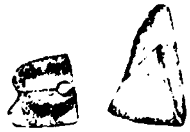
Category 27 Drill Core: (N=15)This is a cylindrical plug shaped piece of stone that is removed from a piece of stone as the result of a drilling technique.

Category 28 Bead Preform: (N=15)This is a small piece of pecked, ground, and polished stone of varying geometric shape, usually cylindrical. It represents an intermediate step in the manufacture of a bead.



Category 29 Muller/ Hammerstone: (N=7)This category combines the attributes of Ground Stone Categories 1 and 6, and is thus a combination tool.

Category 30 Boatstone: (N=1)This is a boat-shaped piece of ground and polished stone similar to Ground Stone Category 13.



Category 31 Anvilstone/ Chopper: (N=1)This category combines the attributes of Ground Stone Category 2 with a roughly pecked chopping edge.

Category 32 Ground Projectile Point/Knife: (N=2)This is a projectile point/knife which is heavily ground and/or polished over a portion or all of the blade or haft element margin.

Category 33 Tubular Pipe: (N=3)This is an elongate, cylindrical stone pipe, drilled longitudinally through the center. The pipe usually tapers from one end to the other.

Category 34 Abrader/ Anvilstone: (N=2)This category combines the attributes of Ground Stone Categories 2 and 5 and is thus a combination tool.

Category 35 Mortar/ Anvilstone: (N=3)This category combines the attributes of Ground Stone Categories 2 and 7, and is thus a combination tool.

Category 36 VOID

Category 37 Mortar/Pitted Anvilstone: (N=1)This category combines the attributes of Ground Stone Categories 3 and 7, and is thus a combination tool.

Category 38 Pitted Anvilstone/Abrader: (N=4)This category combines the attributes of Ground Stone Categories 3 and 5, and is thus a combination tool.

Category 39 Grooved Abrader/ Hammerstone/Pitted Anvilstone: (N=1)This category combines the attributes of Ground Stone Categories 1, 3, and 5 and is thus a combination tool.

<u>Category</u> <u>40</u> Awl: (N=11)This is a thin, slender, elongate piece of petrified wood that has at least one pointed end that exhibits rounding and smoothing.

Debitage

Debitage was treated in a somewhat unconventional manner. This was due primarily to the large volume of excavated material. The traditional examination of each flake for diagnostic technological information through morphological attributes was circumvented through the use of a mass analysis technique. This technique was modeled after Ahler (1975). It consisted of size-grading debitage by different screen sizes and sorting each size grade by material type. The flakes in each resulting group were then counted and weighed to the nearest gram. This procedure reduced flake sorting time while providing a data base usable in assessing technological variability.

It is expected that this data base will be used in conjunction with experimental flaking debris in Phase III to produce models of tool manufacture, use, and discard on these sites. A supplemental sample of flakes should be examined along traditional morphological lines and quantitatively compared to the results of the mass analysis for additional supporting evidence.

The presence of cortex in each flake size grade class was not recorded in this project. Logically, it is expected that the larger the flake size in a class, the more cortex flakes should be present. The debitage from the large testing project (Bense 1982) was classified by both size grade and cortex present. While analysis of the relationship between these attributes was not conducted from that data set, two observations have been made from a 2 by 2 m test unit at 22IT576 and another at 22IT590 (both were excavated in the project reported here). The results, presented in Table 4.10, were somewhat surprising in that no cortex flakes were recovered from the test unit at 22IT576. The factor effecting this situation is most likely to be the lack of availability of raw material to this site, which is 2 km from the Tombigbee River. At 22IT590, the expected correlation between flake size and presence of cortex was present. Eighty percent of the one inch flakes have cortex present, 46% of the 0.5 inch flakes have cortex, and only 25% of the 0.25 inch have cortex present. From this brief observation it appears that at sites such as 22IT590 where raw material was available, this descending correlation will be present. At those sites without access to lithic raw material, the sheer absence of cortical flakes precludes any relationship with flake size.

The size grade categories are presented below along with non-size grade morphological categories. In addition to the three size grades presented here, small flakes from the 1/16" mesh may be sampled in the future to establish a fourth size grade. This small grade size will probably be essential to understanding many of the fine retouch and resharpening techniques.

No metric data were recorded for any of the debitage categories.

Category 1 1" Non-Utilized Flake: (N=1,677)This is a flake which will not pass through a 1" mesh screen and shows no use.

Category 2 1" Utilized Flake: (N=278)This is a flake which will not pass through a 1" mesh screen and shows use. Use is usually indicated by very small continuous flake removals, less than 3 millimeters in width.

Category 3 1/2" Non-Utilized Flake: (N=67,388)This is a flake which will not pass through a 1/2" mesh screen and shows no use.

Category 4 1/2" Utilized Flake: (N=8,954)This is a flake which will not pass through a 1/2" mesh screen and shows use. Use attributes are similar to those of Debitage Category 2.

Category 5 1/4" Non-Utilized Flake: (N=427,592)This is a flake which will not pass through a 1/4" mesh screen and shows no use.

Category 6 1/4" Utilized Flake: (N=10,639)This is a flake which will not pass through a 1/4" mesh screen and shows use. Use attributes are like those of Debitage Category 2.

Category 7 Fire Cracked Chert/Chunk Utilized: (N=669)This is a piece of fire cracked chert or an irregular chunk of a chert fragment. Use attributes resemble those of Debitage Category 2.

Category 8 Non-Utilized Prismatic Blade: (N=76)This is a blade which has been struck from a prepared core and shows no use or modification.

Category 9 Utilized Prismatic Blade: (N=23)This is a blade which has been struck from a prepared core and shows use. Use attributes are like those of Debitage Category 2.

Category 10 Other: (N=2)This is a flake which does not conform to one of the established categories.

Categories 11 - 16 Alabama Testing Reanalysis: These categories were not used in analysis for this project

Category 17 Non-Utilized Blade-Like Flake: (N=1,068)This is a flake which has a length-width ratio of at least 2:1 along the bulbar axis and has lateral edges that are generally parallel.

Category 18 Utilized Blade-Like Flake: (N=186)This is a flake which has a length-width ratio of at least 2:1 along the bulbar axis and has lateral edges that are generally parallel. Use attributes are present which resemble those of Debitage Category 2.

Introduced Rock

This grouping of stone materials refers to all unmodified rock that is thought to have been introduced into the site matrix by the prehistoric inhabitants. It is unmodified in the traditional use of the term. Much of the material is represented by sandstone, both ferruginous and non-ferruginous, which may or may not have been burned.

A certain amount of material, such as small pebbles and other small stone fragments, could have been deposited by natural forces such as water transport. However, for pragmatic reasons, these have been included under the Introduced Rock heading.

Sandstone, conglomerate, hematite, and limonite materials were brought onto the site and probably used in the manufacture of tools or in other activities, such as cooking. Most unmodified debris under this heading probably resulted from such use.

The following categories depict the Phase I breakdown of these materials. Illustrations have not been included.

Category 1 Conglomerate: (N=35,469)This is a material composed of rounded to angular fragments of cherty material greater than 2 mm in diameter. These are set in a fine-grained sandstone matrix of cementing material.

Category 2 Chalk: (N=269)This is a fragment of soft, white to light gray, fine textured material composed primarily of calcite.

Category 3 Limestone: (N=250)This is a coarse to fine grained sedimentary rock composed of precipitated calcite particles.

Category 4 Cobbles, Pebbles: (N=103,857)This is rounded, spherical, oblong, water-worn piece of material, usually chert. It is greater than 2 mm in diameter but less than 256 mm in diameter.

Category 5 Fire Cracked Chert/Chunks Non-Utilized: (N=155,311)This is an unmodified fired chert chunk or spall which exhibits any one or a combination of the following: crazing, irregular cracking, or potlid fracturing. It is the result of heating in the case of the thermal spall or shatter in the case of the chunk.

Category 6 Galena: (N=6)This is a bluish-gray to lead gray mineral which often occurs in cubic or octahedral crystals. The material exhibits perfect cubic cleavage, is relatively soft, and very heavy.

Category 7 Fire Cracked Quartzite: (N=4964)This is a fragment of otherwise unmodified quartzite which exhibits irregular cracks, fissure lines, or potlid fractures.

Category 8 Ferruginous Sandstone: (N=1,882,728)This is a sedimentary rock composed of quartz grains cemented together into a hard form. This form contains iron oxides which gives it a reddish or blackish color.

Category 9 Sandstone: (N=283,247)This category is similar to Introduced Rock Category 8 except the color is tan to buff to gray, due to the lack of iron oxide in the matrix.

Category 10 Petrified Wood: (N=19,104)This is a piece of material formed by the replacement of wood by silica in such a manner that the original form and structure of the wood are preserved.

Category 11 Hematite: (N=41,824)This is a deep red-brown, earthy material containing ferrous oxides.

Category 12 Limonite: (N=28,150)This is a yellowish-brown ferric oxide material, usually earthy.

Category 13 Unworked Hollow Sandstone concretion: (N=2,283)This is a small, hollow ferruginous sandstone concretion that has been broken open but exhibits no modification.

Category 14 Siltstone: (N=737)This is a fine grained sedimentary rock whose particle size is intermediate between that of sandstone and shale.

Category 15 Slag: (N=27)This is a miscellaneous burned, fused material.

Category 16 Crinoid: (N=20)This is a fossilized echinoderm, which has a hollow bead-like form. It is sometimes used for or made into a bead.

Category 17 Fossils: (N=103)This is a piece of material formed by the replacement of plant or animal remains by silica in such a manner that the original form and structure are preserved.

Category 18 VOID

Category 19 Clay Ball: (N=82)This is a spherical or geometric manufactured mass of fire-hardened clay of unspecified size.

Category 20 Quartz: (N=440)This is a form of silica which occurs in hexagonal crystals or in crystalline masses and is usually clear or white in color.

Category 21 Graphite: (N=22)This is a soft, black mineral with a metallic luster.

Category 22 Ochre: (N=404)This is an earthy, hematitic or limonitic material, often impure iron ore.

Category 23 Coal: (N=75)This is a soft to medium hard form of impure carbon, usually shiny black in color.

Category 24 Manganese Nodule: (N=28,623)This is a small, irregular, black-brown concretionary mass which consists of manganese salts and manganese oxide materials.

Category 25 Unidentified: (N=426)This is a piece of introduced rock or debris which does not fit any other category.

Category 26 Steatite: (N=14)This is a compacted, fine-grained, grayish-green metamorphic rock, schistose in form, which is composed of talc along with other minerals.

DATA MANAGEMENT PROCEDURES

INTRODUCTION

Data processing in an archaeological context presents a variety of specialized problems when compared to the relatively routine requirement of business data processing. In archaeology data management not only varies from study to study, but also involves considerable evolution within the context of a single investigation as a consequence of the nature of the research, the amount of information managed, the variation of phenomena, and the research goals. Hence, data management in archaeology must be adaptable to meet the changing needs of the archaeological study.

Any data management program must take into account not only the available computing facilities and personnel, but how adaptable these facilities will be over a period of time given considerable change and development. Case in point: two APPLE II microcomputers were selected initially to perform as stand-alone computers and as remote terminals. Unfortunately, their limited memory, storage capacity, and durability in a field environment proved totally inadequate to meet the project's data processing requirements.

The data requirements for this project were more compatible with a large computing facility which supports an extensive variety of software and hardware. The data management program was, in part, designed around the available computing facilities at the Northeast Regional Data Center (NERDC), located at the University of Florida campus. NERDC is the largest computing installation in a state-wide network which serves faculty, students, administrators, and commercial users throughout the state university system. In addition to being the largest facility, NERDC hosts several of the smaller universities, including the University of West Florida, in instructional and scientific research computing.

Computing facilities at the University of West Florida are largely used for instruction; however, peripheral equipment, such as high speed line printers, card reader/punch, and floppy diskette stations augment the host installation. Printed output, data entry, and graphics can be performed locally as well as at NERDC. UWF also supports several graphics devices, including a TEKTRONIX 4027 color terminal, and TEKTRONIX 4051/4052 with TEKTRONIX 4662/4663 plotters.

Three terminals, a Televideo TVI-912B and and two ADM-3As, interface the field headquarters in Fulton, Mississippi with NERDC via telephone lines. A Vadic VA3451 modem permits 1200 baud (120 characters per second) transmission which facilitates quicker turn around time and print speed. An IDS 440 and an IDS 560 produce low speed (300-1200 baud) dot matrix hard copy output.

THE COMPUTING ENVIRONMENT

The computing sytem at NERDC consists of an IBM 3033N with 12 megabytes of main memory and an AMDAHL 470 V/6-11 with 10 megabytes. The IBM 3033N and the AMDAHL 470 share interactive and remote job entry computing via the OS SYSTEM 370 operating system. SYSTEM 370 operates in a Multiple Virtual Storage (MVS) environment which permits the central processing unit to optimally maximize the computer's resources. JES2 controls batch computing. Time sharing is available through CICS, TSO, or CMS.

NERDC supports a variety of IBM-compatible peripheral equipment, including IBM 1403 high speed line printers, PRINTRONIX compressed printers, card reader/punch, 9 and 7 track tape (6250 bpi) drives, GOULD and CALCOMP graphics plotters, computer output microfiche recorder/processor, etc.

NERDC maintains an extensive list of statistical and graphic packages, and data base management systems. Several software

programs which are utilized or intended to be used during subsequent phases of investigation, include the following:

- SAS (Statistical Analysis System)
  SAS/GRAPH (SAS Graphics System)
  SASSPSS (Interface between SAS and SPSS)
  SAS/ETS (SAS Econometric and Time-Series Analysis)
- SPSS (Statistical Package For The Social Sciences)
  SCSS (Conversational SPSS)
- BMDP (Bio-Medical Computer Programs)
- SYMAP (Synagraphic Mapping Program)
  SYMVU (Three-Dimensional plotting/companion to SYMAP)
- SURFACE II (Kansas Geological Survey Graphics Program)

Utility programs perform the myriad of secretarial chores vital to a data managment program. NERDC supports a large number of utilities: IBM products, NERDC modifications, Vendor-purchased. These programs permit the programmer to create and access files, make updates and corrections, produce copies on magnetic tape, punch output on cards, produce output on line printers or microfiche, or any variety of applications necessary in a flexible data processing environment. Several utility programs are listed below:

Name	Function	Mode
QED	Text Editing	TSO and Batch
EDIT	Text Editing	TSO
PANVALET	Text Editing	TSO
SCRIPT	Text Editing/Formatting	TSO, ATMS, Batch
SYNCSORT	Sorting	Batch

NERDC offers ATMS III (Advanced Text Management System), a word processing system designed for interactive text creation, editing, and formatting. ATMS operates in an IBM CICS/VS environment. A word processing operator enters text at a terminal with the embedded control statements necessary to format the completed document. Once the document is stored on disk or tape, it can be corrected or reformatted according to the operator's specifications. The completed document can either be printed out at the terminal or via a high speed line printer in Gainesville. This report was processed with the ATMS III system.

DATA ORGANIZATION

Data organization implies that data are collected in a meaningful way and can be easily facilitated by a custom program, an existing software program, or a combination of the two. A report can be written in any of several conventional languages - Fortran, COBOL, PL/1, BASIC, etc. - however, the time required to design even a simple report is often prohibitive when compared to using

an existing software system. There is a trade-off when using existing software; data must be structured to "fit" into software, which sometimes forces the researcher to collect data for the program, not his/her own design. SPSS, for example, is an extremely powerful statistical system; however, its file-handling capabilities are quite inadequate for multi-file processing, text data, file merging, etc. Initially, to compensate for this problem, several programs were written to manipulate data for inclusion into SPSS. These programs were created to check for errors, sort files, merge files, etc. The disadvantage of this solution was that it took several programs to manipulate the data for SPSS to process, which translates into unacceptable turnaround time.

Data base management systems facilitate interactive queries; however, they can only perform the most simple arithmetic functions. Data base management systems are essentially file managers, which permit data to be read in one way and be written out in any number of ways. Data base management systems, when used in conjunction with statistical and graphics packages, offer the researcher a viable file management and statistical/graphics system.

Statistical Analysis System

The data management capabilities offered by the Statistical Analsysis System (SAS) make it an excellent alternative to traditional data base management systems. While SAS is technically an integrative system of statistical programs, its inherent language facility (PL/1) makes it a flexible, powerful file manager. SAS takes advantage of the tremendous formatting capabilities of PL/1 and will permit the researcher extraordinary data manipulation capabilities. SAS can accept data from cards, disk, or tape and output information to a number of different storage media including microfiche. SAS can read existing files from SPSS and BMDP and convert these data to SAS files with amazing efficiency.

NERDC supports an interface between SAS and SPSS which allows SPSS procedures to be run from SAS data sets. This procedure was created by Peter Beutel at the University of Heidelberg and is not a licensed SPSS or SAS product, but expands NERDC's integrative statistical software.

Not only is SAS a powerful data formatter, it also has excellent file handling capabilities for input from several files. SAS can concatenate or merge two or more files and then write this information out to a new file so that other programs, e.g. SPSS, can utilize the information.

SAS's built in utilities make it an even more attractive system. In addition to sort/merge functions, SAS makes the following utility procedures available:

- BMDP (Interface with the BMDP procedures)
- COVERT (Conversion of BMDP, SPSS, OSIRIS files for input into SAS)
- COPY (Copies data sets)
- CONTENTS (Produces update history of SAS data sets)
- DELETE (Deletes SAS data sets)
- EDITOR (Interactive or batch editor for editing both conventional and SAS files)
- PRINTO (Routes output to tape, disk, etc.)
- SORT (Numerical and alphabetic sorting of two or more variables)
- SPSS (Interface between SAS and SPSS via SASSPSS)
- TAPECOPY (Copies tape volumes)

SAS enables the researcher to use programming-like statements. IF-THEN/ELSE, DO/END, DO UNTIL, and DO WHILE statements allow considerable flexibility in making calculations, accumulating totals, checking for errors, etc. Assigning new variables and creating programming-like statements enhances not only data modifications but also the actual statistical and report procedures. Report writing in SAS, for example, can be easily facilitated by reading in data, making calculations from the data, setting up counters/accumulators, and finally writing out the final report via an existing report procedure, or creating a report via report-writing statements.

SAS statistical procedures are among the finest and most powerful in the world. SAS is used by statisticians, marketing and economic researchers, social scientists, bio-medical researchers, businessmen, and systems analysts. Existing statistical programs are constantly being updated and new procedures are being included in an expanding library of statistical routines. We, however, use only a small, but powerful number of SAS procedures. This list includes the following:

- ANOVA	Analysis of Variance
- CHART	Vertical, Histogram, Block, Pie, and Star graphics
- CORR	Correlation analysis
- FREQ	One-way and n-way frequency tables/crosstabulation
- MEANS	Descriptive statistics
- PLOT	Two variable plotting on line-printer
- PRINT	Report-writing facility
- SUMMARY	Summary statistics for data modification
- TTEST	T-Tests
- UNIVARIATE	Univariate descriptive statistics

SAS/GRAPH is a computer graphics system which modifies existing SAS procedures (and introduces several new ones) for producing

excellent quality graphics. The user can title, footnote, and choose from a variety of character fonts. Graphic reports can be saved on disk or tape for regeneration at a later date. SAS/GRAPH produces color graphics on graphics display terminals and plotters and includes the following procedures:

- GCHART	Vertical, Histogram, Block, Pie, and Star charts
- GPLOT	2-3 variable plotting, symbol and fill options
- GCONTOUR	Three variable plots represented in two dimensions
- G3D	Three dimensional surfaces, with tilt and rotation
- GMAP	Choroplethic and surface maps, with reduction and projection techniques
- GPRINT	Graphics enhancements of other (non-graphics) SAS procedures

SAS is much more efficient in I/O (input/output) costs when compared to similar facilities in SPSS. SAS was designed to maximize SYSTEM 370's resources and PL/1, whereas SPSS (and BMDP, SYMAP, and SURFACE II) uses a Fortran compiler which, under SYSTEM 370, is not as efficient (as compared to PL/1).

File Organization

An important (and often overlooked) consideration in the design of a data management program is file organization: how data are stored for access and how they are organized. It has already been stressed that data must be structured to "fit" existing software, however, it is also important to collect data in a way that minimizes keypunching, duplicate storage, and computer input/output time. It is important to consider how often the data will be accessed and whether interactive queries are desired. All of the problems will bring about different solutions, which at best, can be described as a trade-off.

Magnetic tape is probably the least expensive storage medium available at most computer installations and can store an almost unlimited amount of information. Tape is not only inexpensive, but generally transportable from installation to installation. Software such as SAS and SPSS can read directly from tape and in computing environments where disk space is at a premium, this is an added incentive. However, there are many drawbacks to using tape exclusively. Taped data cannot be accessed directly, which is unsuitable for interactive queries and frequent file updates. Because tape files are sequentially ordered data must be read record by record, until the desired information is located. This latter fact is important in weighing I/O (input/output) costs of

a computer program since inefficient I/O may negate any savings magnetic tape might offer.

Disk storage, however, is ideal for interactive computing and permits quick file updates because unlike tape, records of data can be randomly accessed. At most installations disk storage is very expensive. If the expense can be tolerated, it becomes paramount to organize data in such a way that I/O and storage costs will at least be minimized. For example, partitioning major data sets into subfiles decreases I/O costs since a program need not search through the entire collection of information when seeking a particular section. (This consideration is not nearly as important in tape storage as it is for disk storage.)

Perhaps the wisest course is to employ both tape and disk storage. Tape lends itself for occassional access of unimportant information and for data security. Two copies of our most important data files are copied to tape each week in the event the disk data set is damaged or destroyed. Occassionally accessed files are also taped to circumvent monthly disk storage charges. Disk storage is best utilized for frequently accessed or updated files, as stated earlier.

Efficient disk storage requires a combination of inovative and traditional approaches to file organization. Duplicative data is a needless expense which only increases storage costs (and keypunching, maintenance, etc.). One solution to this problem is to store types of information in separate files and combine this information by a linkage routine. The field provenience file, for example, is largely an address register locating an artifact or group of artifacts in space. Coordinates, elevations, excavation strategies, etc. all address where cultural material came from. The artifactual data file describes each (or a group) specimen. For the information to be complete, the provenience address must be merged to each artifact record; but this information need not be stored together. By merging the types of data during the actual program's execution unnecessary storage is eliminated.

A third file contains artifactual information with measurements. This file partially duplicates the other artifactual file. Unfortunately, this was necessary because measurements were not originally part of the laboratory artifact inventory. Like the regular artifact data, artifact measurement data can easily be merged with the provenience information.

File merging is made possible via SAS; an earlier version was written in PL/1 and is only occassionally used. Both data types (artifactual and provenience) share common variables (SITE and ID). Data are first sorted by SITE and ID, and then merged. The merged information may be used during the program's execution or

be written out to another file for inclusion into SPSS or some other program.

DATA MANAGEMENT/LAB-FIELD INTERACTION

Data processing operations from the project's inception can be characterized as playing a catch-up role with lab and field operations. Decisions made early on in the project - such as equipment purchases and data organization - obligated data management into finding makeshift solutions in a number of areas. Moreover, the early inadequacy of the data management program pointed to better coordinated planning between the lab, field, and data management. Instead of operating in a vacuum, data management was needed to integrate, coordinate, and disseminate the collection of information.

As stated earlier, several decisions made early in the project's planning created a number of problems and were eventually changed. Data entry was a major problem since the original coding forms were quite esoteric and contributed to keypunch error. Data was also entered on equipment (APPLE II microcomputers) not expressly designed for inputting, and by personnel not trained in entry techniques. The result was an unacceptably high rate of errors which had to be corrected. Data organization was also a basic problem. Some data collected were unnecessary while other data, essential to efficient processing, were absent.

Several months into the project, the data management system was completely restructured. The data were streamlined for storage and processing efficiency. The coding forms were then revised to reflect these organizational changes and to promote off-site data entry. Keypunching was diverted to a combination of on-site and off-site entry: artifact coding forms were entered via a remote terminal tied into NERDC, and provenience and measurement coding forms were entered professionally off-site. Accuracy improved, but at the cost of delayed turn-around from data management.

Data management also evolved into being a repository for all data coding forms, a rather ominous task considering the sheer volume of information at hand. What was required to control the paper explosion was one person to monitor the flow of information from the field, lab, and data management operations. Forms were examined for mistakes, then collated to match field provenience with artifacts. Field provenience forms were then sent to the Institute for Mathematical and Statistical Modeling at the University of West Florida for inputting. Artifact coding forms were entered on site. Once the information was input, the coding forms were once again collated, bound, and archived for security and comparison.

File updates, as the result of changes in the field and lab, keypunching mistakes, coding errors, etc. were incorporated into the daily routine. Again, the sheer volume of data, and hence, errors contributed to some massive logjams.

To insure accuracy in the data, several routines were designed to eliminate duplicate data, to search for erroneous values or unacceptable combinations of values, and to search for "garbage" chrracters. These programs, however, served only to identify the obvious mistakes; errors as the result of coding mistakes went undetected. Initially, it was anticipated that a 20-30% sample of the data could be examined for accuracy. Unfortunately, an unacceptable error rate proved that the data needed 100% verification to insure confidence. This task became almost prohibitively time-consuming and pointed out the need to provide better quality control over the coding process, to eliminate on-site keypunching, and finally, to enter data only upon completion of a site.

Upon obtaining confidence in data, output was produced via SAS or SPSS. Hard copy output was either routed to NERDC or UWF, or when possible, printed locally. Experimental versions of BMDP, SYMAP, and SURFACE II programs were created, but were never used in production output.

The present data management program reflects adaption to an evolving archaeological study. To some extent, the program in Phase I was a "band-aid" operation, a series of makeshift solutions to early decisions. Still, the data management program is a viable system which permits development and refinement in several areas during subsequent studies. By utilizing an excellent computing facility (NERDC) and sophisticated software (SAS) the data management program lends itself to continued growth and development.

A Data Management User's Manual has been included in Appendix VI to expand on the concepts offered herein. Included in the manual are the following:

- Simple file manipulation commands
- Accessing SAS and SPSS interactively and via batch
- Description of several SAS programs
- An extensive bibliography for operating the afore mentioned software packages under IBM SYSTEM 370 and NERDC
- Glossary of basic TSO commands

SPECIAL STUDIES PROCEDURES

The following are descriptions of the methods and techniques employed for specialized aspects of Phase I research. As an interdisciplinary study, Phase I involved the participation of num-

erous consultants who, as a team, made a positive contribution to the degree and content of the research program.

The studies completed by Phase I consultants have been incorporated in several sections of this report. Where possible, special studies data have been included in the site report chapters (e.g., soils/sediment data). However, additional information provided by the consultant team is summarized in the final chapter of this report and several of the longer studies are included in Appendix III. The methodological statements presented below encompass all special studies conducted during the Phase I investigations.

LITHIC ANALYSIS

The study of lithic artifact samples from Phase I sites involved initial analysis, sorting, and classification and was conducted by laboratory personnel. A secondary review and evaluation of lithic categories was conducted by members of the project senior staff. In addition, critical assessments of the lithic analysis and classification system were provided at two intervals during the project. These reviews provided both an evaluation of the theory and methods developed for the classification of lithic materials and possible directions for future study (see Appendix III). The specific details of the lithic classification system employed during Phase I are presented in Chapter 4 and in the Laboratory Manual (Appendix IV) and therefore will not be repeated here. Although the intent of the lithic classification system was to provide consistency across the 11 sites included for investigation, some variation in the manipulation and interpretation of specific lithic artifact categories was unavoidable. Modifications of the lithic classification scheme have been noted where they occur in the site reports contained in this study.

CERAMIC ANALYSIS

Ceramic samples from each site were classified using type descriptions/collections established at the start of laboratory operations as a point of reference. The specific details of this classification scheme are described in Chapter 4. The Laboratory Manual (Appendix IV) should be consulted for the details of this analysis. A review and evaluation of the ceramic classification was conducted by the project senior staff as part of the preparation of the Interim Report on Phase I.

GEOARCHAEOLOGY

Geomorphological analysis during Phase I included examinations of on- and off-site sedimentary sequences, particle size and chemical analyses of selected stratigraphic units (on-site), a review and evaluation of ongoing paleoenvironmental research in and adjacent to the Upper Tombigbee Valley, and consultations between the project senior staff and paleoenvironmental specialists. The paleoenvironmental consultants contacted during Phase I included David L. Pettry, Guy R. Muto, Fred L. Nials, Donald R. Whitehead, Mark C. Sheehan, and Elizabeth Sheldon. The preliminary statement on geomorphological research included in this report was derived from discussions with the consultant team and through a synthesis of pertinent paleoenvironmental studies in the area, particularly the recent work of Muto and Gunn (1981) in the Upper Tombigbee Valley. Also incorporated in the present study is a synopsis of culture historical information and radiocarbon age determinations derived from the Phase I analysis.

SOIL METHODOLOGY

Soil investigations were made via linear transects across the sites and adjacent geomorphic positions. Topographic slopes were measured with an Abney level. Soil profiles were examined through augering (soil bucket) and examination of excavated pits, using standard methods (Soil Survey Staff 1951). Soil morphological descriptions, including Munsell color, texture, structure, consistency and boundary, were determined using standard methods (Soil Survey Staff 1951). Samples were collected from representative pedons and sealed in plastic bags for laboratory analyses. Soil samples were air-dried and sieved to remove coarse fragments (¶2 mm). Particle size distribution was determined by the hydrometer method (Day 1965), and sand fractionation by dry sieving. Organic matter was determined by the wet combustion procedure (Wakely and Black 1934). Extractible acidity was determined by the barium chloride-triethanolamine method (Peech 1965). Exchangeable aluminum was determined following the procedure of Yuan (1959). Soil pH was measured in water using a 1:1 soil/liquid ratio and a Coleman pH meter (Model 39) with a glass electrode. Organic phosphorus was determined using the HCl extraction and ignition method of Legg and Black (1955). Free iron oxides were determined by a dithionite-citrate-bicarbonate method (Mehra and Jackson 1960). Exchangeable cations were extracted with neutral 1 N NH-4OAC and determined through atomic absorption spectrophotometry. Bulk density was determined by the non-disturbed core method (Blake 1965).

Chemical coring was conducted at 22IT539 and 22IT576 during Phase I. The purpose of chemical coring was to provide information on

activity areas or other cultural anomalies within these sites prior to excavation. Chemical tests conducted on the samples from these sites included analyses of phosphorus (PO' spot test) and soil/sediment pH.

Core samples were extracted using a bucket auger and individually bagged and labeled in the field. A four meter interval sampling was employed to provide maximum coverage of each site. Additional core samples were taken at 2 m intervals and visually inspected as an aid in the identification of stratigraphic units and/or cultural anomalies. Core samples were transferred to the field laboratory on a daily basis for completion of the phosphorus and pH analyses.

The methods employed in the phosphate spot test generally conform to those described by Eidt (1973). Soil pH was measured using a 1:1 soil/lipid ratio and a Chemtrix (Type 40/40E) pH meter with a glass electrode.

METHODOLOGY OF FAUNAL IDENTIFICATION

Faunal samples from 22IT539 and 22IT576 were recovered by flotation and fine screening techniques from controlled locations within the site. The vertebrate remains were separated from the rest of the cultural debris recovered (e.g., charcoal and lithic debitage). The faunal remains were bagged separately, with the appropriate site, square, and level information noted on the bag.

These clean, sorted samples of faunal remains were sent to the zooarchaeologist, Dr. Arthur Bogan, for identification and analysis. Each bag was processed separately. All of the provenience data were recorded and the material separated into the five vertebrate classes. Each individual fragment was carefully examined and an identification recorded. These identifications were verified by comparing the fragments with modern comparative skeletons. When the contents of the bag had been examined, totals for each taxon were recorded. This procedure was completed for each bag of faunal material from a site. A list of the taxa was compiled by excavation unit, along with a summary listing of the taxa identified in the total sample.

The faunal samples included for analysis consisted primarily of badly fragmented and calcined bone fragments. Poor preservation environments, combined with the calcined and fragmented nature of the samples, precluded positive identifications in many instances. These factors precluded detailed analysis and interpretation of the faunal samples analyzed.

ARCHAEOBOTANY

Microbotanical Analysis

Pollen Analysis

Sediment samples from three Phase I sites (22IT539, 22IT576, and 22IT590) were submitted to Donald R. Whitehead and Mark C. Sheehan at Indiana University for pollen analysis. Samples (5 cc) were prepared using a standard concentration technique (modified from Mehringer 1967). Sediment samples were treated, sucessively, in KOH, HCl, HF, and acetolysis solution. Silicon fluid was used as the mounting medium in the preparation of slides. All slides were scanned at a magnification of 125X in order to estimate pollen concentrations. Pollen identifications were conducted under magnifications of 500X and 1250X. All pollen and spores were tabulated and when possible, estimates of charcoal, fungus spores, fungal hyphae, "organic debris," and crystalline inclusions were provided. Additional sediment from samples submitted for analysis was retained for future reference.

Biosilicate Analysis

An analysis of biosilicates was conducted on sediment samples derived from Sites 22IT539 and 22IT576 by the Archaeometry Laboratory, University of Minnesota-Duluth. Ten samples from each site were examined for opal phytoliths. The results of this study are presented in Appendix III.

A phytolith is a deposit of opaline silica ($SiO_2 \cdot nH_2$) that forms in a plant cell and subsequently is deposited in underlying sediment upon death and decay of the plant. Phytoliths have many shapes and range in length from less than 2 microns to 1 millimeter. Plants are not represented by a simple phytolith, but rather by an assemblage of phytoliths (Moody 1972). The deposition of phytoliths for the most part is local, which enhances their value as indicators of paleobotanical communities, and potentially, paleoenvironments.

In the present study, phytoliths were extracted using a modified version of the techniques first developed by Rovner (1971). Sediment samples were dried and successively treated in solutions of sodium hexametaphosphate and distilled water, HCl, and distilled water rinses, and floated to facilitate extraction in a solution of tetrabromoethane and absolute ethyl alcohol. Following extraction, samples were mounted on microscope slides and subjected to both scanning electron microscope (SEM) and Namarski optical study for identification of phytoliths.

The variation present in the phytoliths identified from 22IT539 and 22IT576 will require further analysis using modern plant species as a guide to the identification of plants from archaeological sediments. At present, a key for the identification of biosilicates of plant species from the southeastern United States does not exist. A more detailed analysis of samples derived from the Upper Tombigbee Valley, therefore, must await further study and the development of a specific plant key for this area.

Macrobotanical Analysis

Samples submitted for macrobotanical analysis were derived from sediments processed through either flotation or fine screening techniques. Following field processing (flotation or fine screen), the "macro" samples were sent to the field laboratory. In the lab the samples were dried and sorted into major botanical (e.g., carbonized nutshells) or constituent (e.g., rootlets, baked clay nodules) categories.

Samples were generally examined under 10X magnification as an aid in the identification of carbonized matter. Control column samples, occasional general level samples, and selected feature samples were submitted for taxonomic identifications to Elizabeth Sheldon at Auburn University-Montgomery.

Each botanical sample was examined and sorted under a Bausch and Lomb 10-70X dissecting microscope. Fragments classified as involucre or pericarp of hickory (*Carya spp.*) or oak (*Querus spp.*) or wood (xylem) were weighed on an Ohaus triple beam balance.

The wood was identified to the genus level by comparison to specimens in the comparative collection at Auburn University-Montgomery, to a dicot wood key (King n.d.), and to illustrations in *The Structure of Wood* (Jane 1959). Unfortunately, identification to the species level is not possible without preparation of microscope slides and examination at much higher magnification. Even then, within some genera (e.g., *Pinus*, *Carya*, and *Querus*), species are indistinguishable. Because many fragments are too small to identify below the class level (Gymnospermae or Angiospermae), any specific sample may include more genera than were identified during this analysis.

Seeds were identified by comparison to those in the comparative collection at Auburn University-Montgomery and by reference to a number of manuals (Eickmeir 1974; Harlow 1959; Martin and Barkley 1973; Radford, Ahles, and Bell 1968; Symonds 1958). The numbers of seeds contained in each sample were counted during analysis.

HUMAN OSTEOLOGICAL ANALYSIS

The analysis of human remains from Phase I sites was hindered by the generally poor condition of recovered bone samples. In many instances, human skeletal remains encountered in field situations amounted to little more than streaks or smears in the ground. Bone samples that could be removed from the ground are generally fragmentary and, therefore, are not conducive to an extensive analysis.

A preliminary analysis of osteological remains was conducted by Robert I. Gilbert, Jr., Memphis State University, during Phase I (see Appendix III). The intent of this examination, however, was to provide tentative assessments of the sexes and ages represented in each site sample, as well as a direction for future study. Several of the burials recovered remain jacketed in plaster pending further analysis; in view of the poor condition of the Phase I burials, it is unlikely that definitive statements on this sample will be forthcoming if the traditional analytical methods currently available are used.

DATING METHODS

C-14

Carbonized organic matter, consisting primarily of hickory nutshells (Carya) and wood charcoal, was used to provide radiocarbon age-determinations at the four major excavation sites (22IT539, 22IT563, 22IT576, and 22IT590) and one tested site (22IT606). Most of the carbonized organic matter submitted for dating was derived from fine-screened or flotation samples of control column, general level, or feature fill. With only several exceptions, the organic samples were collected from levels of 5 cm to 10 cm thickness and the resulting dates therefore represent stratigraphic rather than event ages.

Following selection of units (levels/components) of features to be dated, samples were sorted and hand-picked to remove rootlets and other extraneous (noncarbonized) matter. Samples that retained sediment coatings and/or numerous fine rootlets were submerged in a Calgon and distilled water solution and rinsed in two separate distilled water baths. All samples were processed through a minimum of two distilled water rinses. Samples were then oven dried and examined one last time for extraneous matter prior to packaging for submission to the radiocarbon laboratory. Sample weights generally were in excess of 10 g, although several smaller samples (§ 10 g) were submitted following consultation with personnel at the radiocarbon laboratory.

All Phase I radiocarbon samples were submitted to Dicarb Radioisotope Company for processing. At the Dicarb Lab, samples were first examined under a microscope and cleaned of all obvious impurities. Samples were then treated with 2N NaOH at 100° C for thirty minutes for the removal of humic acids, washed, and then picked for rootlets while wet. Next, samples were treated with 2N HCl at room temperature for approximately forty-eight hours for the removal of free carbonates, washed, picked for rootlets while still wet, dried at 90° C, examined again for rootlets while damp, and dried overnight at 80° C. Samples were then picked, piece by piece, under 20X magnification and burned in a quartz furnace under partial vacuum in the presence of pure oxygen. Using the benzene method, carbon dioxide is converted to lithium carbide which in turn is converted to acetylene and then trimerized to benzene. The sample benzene is then placed in a tared teflon vial and adjusted to a final volume of 3 ml with spectrophotometric grade benzene, should this be necessary due to small sample size. A 2 ml scintillation cocktail is then added to the sample being processed. Sample activity was counted in one of five Packard #3255 Tri-Carb Liquid Scintillation Spectrometers for an average of 2700 minutes. Background was counted for an average of 1400 minutes adjacent to each sample.

Archaeomagnetic Sampling: Field Procedures

Archaeomagnetic dating samples were recovered from fired clay concentrations at three sites, 22IT539, 22IT576, and 22IT590. The dating sample usually is composed of twelve cubes, however, as few as nine cubes can produce an acceptable date. The samples consist of a rough cube of fired earth approximately 2.5 cm on a side completely encased in nonmagnetic plaster of Paris. The value of the sample cube lies in recording the in situ magnetic orientation of the cube for later comparison and analysis.

The best condition for cutting samples was when the soil was moist. Freshly excavated areas can usually be easily sampled. In the case of fired areas that had dried considerably, this condition was achieved by marking the site of the fired clay concentration and covering it with soil or by wetting it with water and covering the area overnight with plastic. Two parallel troughs were cut the following day, leaving a strip of fired clay approximately 4 mm smaller than the interior dimensions of the mold. Shorter perpendicular cuts which isolated pedestals of oxidized earth were spaced in order not to have two metal molds next to each other at one time. The metal molds were placed over these pedestals and plaster of Paris was poured into the molds. The orientation of the mold was determined by a hatch mark cut into the side of the mold. This was always placed in the northeastern corner. The mold number (stamped in the alloy), the degree

reading, the number of the cube in the series, and any observations were noted at the time that the cube location was mapped.

After all of the cubes had been extracted, two small soil samples were collected. These samples represented the quality and depth of oxidation in the archaeomagnetic sample. One of the latter samples was then sent to the Earth Sciences Lab, University of Oklahoma, and the other was held for future reference.

The laboratory methods and results of the archaeomagnetic study were not available for comment as of this writing. This information will be included as part of a future report (Phase II) of investigations in the Upper Tombigbee Valley.

Table 4.1. Correlation of Gainesville Lake Area Projectile Point/Knife Clusters and Tennessee-Tombigbee Waterway Area Projectile Point/Knife Types.

**Late Woodland-Mississippian Triangular Cluster* (A.D. 700-1500)
  **Late Woodland/Mississippian Small Triangular

Middle Woodland Tapered Shoulder Cluster (A.D. 400-700)
  Tombigbee Stemmed

Lanceolate Expanded Haft Cluster (100 B.C. - A.D. 400)
  Mud Creek
  Swan Lake
  Bakers' Creek

Lanceolate Spike Cluster (100 B.C. - A.D. 400)
  Bradley Spike

Flint Creek Cluster (1000-300 B.C.)
  Flint Creek

Wade Cluster (1200-700 B.C.)
  Wade
  Cotaco Creek

Little Bear Creek Cluster (2500-1000 B.C.)
  Little Bear Creek
  Gary

Benton Cluster (3800-3000 B.C.)
  Benton

Morrow Mountain-Sykes White Springs Cluster (5000-4000 B.C.)
  Vaughn
  Sykes/White Springs
  Morrow Mountain

Eva Cluster (6000-5000 B.C.)
  Eva

Bifurcate Cluster (6700-6200 B.C.)
  Bifurcate

Kirk Cluster (7500-6500 B.C.)
  Kirk

<u>Hardaway Cluster</u> (8000-7500 B.C.)
Hardaway

<u>Big Sandy Cluster</u> (8000-7500 B.C.)
Big Sandy

<u>Dalton Cluster</u> (8000-7500 B.C.)
Dalton

<u>Lanceolate Paleo Cluster</u> (9000 B.C.)
Clovis
Beaver Lake

* Clusters from Ensor (1981)

** Categories used in this project's classification

Table 4.2. Measurement Summary Statistics for Projectile Point/Knives

VARIABLE	N	N MISS*	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Baker's Creek								
WEIGHT	1	0	7.5	-	7.5	7.5	0	-
LENGTH	1	0	51.7	-	51.7	51.7	0	-
WIDTH	1	0	20.3	-	20.3	20.3	0	-
THK	1	0	7.5	-	7.5	7.5	0	-
BSLW	1	0	15.7	-	15.7	15.7	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	0	1	-	-	-	-	-	-
HAFTL	0	1	-	-	-	-	-	-
Beachum								
WEIGHT	2	8	9.0	1.8	7.7	10.3	2.6	3.4
LENGTH	2	8	40.8	5.9	36.7	45.0	8.3	34.4
WIDTH	7	3	30.9	1.9	28.1	33.8	5.7	3.5
THK	5	5	8.4	1.3	6.6	9.9	3.3	1.7
BASLW	4	6	21.6	1.4	20.3	23.0	2.7	2.1
SHOULDRW	9	1	29.6	2.2	26.3	33.2	6.9	4.9
JUNCW	10	0	21.0	2.3	16.5	24.5	8.0	5.3
HAFTL	4	6	7.9	0.6	7.5	8.8	1.3	0.4
Beaver Lake								
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	0	1	-	-	-	-	-	-
BASLW	1	0	29.4	-	29.4	29.4	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	1	0	25.6	-	25.6	25.6	0	-
HAFT	1	0	13.3	-	13.3	13.3	0	-
Benton Barbed								
WEIGHT	6	10	17.6	4.3	13.0	22.7	9.7	18.6
LENGTH	8	8	66.0	19.2	47.3	103.4	56.1	368.7
WIDTH	8	8	31.6	5.6	21.5	40.9	19.4	31.8
THK	9	7	8.0	1.0	6.4	9.0	2.6	1.0
BASLW	12	4	22.2	5.1	13.6	32.5	18.9	25.8
SHOULDRW	12	4	31.6	6.7	18.2	41.1	22.9	45.0
JUNCW	14	2	22.3	3.9	17.3	32.5	15.2	15.2
HAFTL	10	6	12.3	4.8	7.6	20.9	13.3	23.0

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Benton Extended Stem					
WEIGHT	11	52	15.9	5.3	10.0	26.5	16.5	28.5
LENGTH	12	51	66.3	14.7	52.2	100.7	48.5	214.9
WIDTH	31	32	31.0	4.6	20.6	38.7	18.1	21.2
THK	16	47	8.5	1.9	6.1	13.9	7.8	3.7
BASLW	57	6	21.7	3.5	16.0	31.2	15.2	11.9
SHOULDRW	42	21	31.0	3.7	21.8	38.1	16.3	13.6
JUNCW	56	7	22.3	2.4	14.6	26.6	12.0	5.6
HAFTL	50	13	13.1	1.8	8.9	17.7	8.8	3.4
			Benton Short Stem					
WEIGHT	53	205	16.0	5.5	6.9	33.0	26.1	29.8
LENGTH	59	199	62.6	18.1	37.7	126.5	88.8	328.3
WIDTH	139	119	31.2	3.7	20.3	43.7	23.4	13.7
THK	104	154	8.2	1.5	4.1	13.4	9.3	2.3
BASLW	196	62	21.6	3.4	10.8	33.4	22.6	11.5
SHOULDRW	186	72	30.5	3.7	9.5	42.5	33.0	13.9
JUNCW	235	23	22.7	2.5	15.6	31.8	16.2	6.4
HAFTL	180	78	10.1	2.2	0	22.2	22.2	5.0
			Big Sandy					
WEIGHT	4	13	7.3	2.5	5.2	9.5	4.3	6.0
LENGTH	4	13	43.4	6.4	37.2	52.3	15.1	40.6
WIDTH	11	6	25.3	3.2	21.9	30.4	8.5	10.1
THK	11	6	7.4	1.1	6.0	9.6	3.6	1.3
BASLW	13	4	22.1	3.7	16.9	28.4	11.5	13.5
SHOULDRW	12	5	24.1	3.7	18.7	29.5	10.8	13.5
JUNCW	16	1	17.3	2.9	13.1	22.9	9.8	8.6
HAFTL	12	5	13.0	2.6	8.3	17.0	8.7	6.6
			Big Slough					
WEIGHT	1	0	9.2	-	9.2	9.2	0	-
LENGTH	1	0	37.9	-	37.9	37.9	0	-
WIDTH	1	0	29.0	-	29.0	29.0	0	-
THK	1	0	10.0	-	10.0	10.0	0	-
BASLW	1	0	19.1	-	19.1	19.1	0	-
SHOULDRW	1	0	28.3	-	28.3	28.3	0	-
JUNCW	1	0	21.7	-	21.7	21.7	0	-
HAFTL	1	0	12.8	-	12.8	12.8	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Bradley Sike				
WEIGHT	3	1	4.4	0.8	3.6	5.1	1.5	0.6
LENGTH	3	1	48.7	1.6	46.8	49.8	3.0	2.7
WIDTH	3	1	14.7	4.9	11.7	20.4	8.7	24.1
THK	4	0	8.1	1.5	6.8	10.3	3.5	2.3
BASLW	3	1	6.2	0.8	5.4	7.0	1.6	0.6
SHOULDRW	2	2	15.3	4.6	12.1	18.6	6.5	21.1
JUNCW	2	2	11.2	1.8	9.9	12.5	2.6	3.4
HAFTL	2	2	11.3	1.2	10.5	12.2	1.7	1.4
				Collins				
WEIGHT	1	0	3.0	-	3.0	3.0	0	-
LENGTH	1	0	27.7	-	27.7	27.7	0	-
WIDTH	1	0	17.7	-	17.7	17.7	0	-
THK	1	0	7.6	-	7.6	7.6	0	-
BASLW	1	0	8.8	-	8.8	8.8	0	-
SHOULDRW	1	0	17.5	-	17.5	17.5	0	-
JUNCW	1	0	10.9	-	10.9	10.9	0	-
HAFTL	1	0	9.1	-	9.1	9.1	0	-
				Cotaco Creek				
WEIGHT	5	9	10.3	1.2	8.3	11.2	2.9	1.4
LENGTH	5	9	48.4	5.3	39.1	52.2	13.1	28.3
WIDTH	11	3	32.8	3.4	28.7	38.1	9.4	11.7
THK	8	6	7.9	0.8	6.7	9.0	2.3	0.7
BASLW	12	2	12.4	2.3	9.2	17.2	8.0	5.2
SHOULDRW	12	2	30.6	4.5	22.9	37.7	14.8	20.1
JUNCW	14	0	15.2	2.4	12.1	20.0	7.9	5.8
HAFTL	12	2	11.3	1.5	9.8	13.6	3.8	2.3
				Crawford Creek				
WEIGHT	6	3	13.4	6.5	7.2	25.1	17.9	41.9
LENGTH	6	3	51.3	14.8	29.2	67.9	38.7	219.5
WIDTH	6	3	30.3	2.8	27.5	35.6	8.1	8.1
THK	8	1	9.3	2.4	6.2	12.5	6.3	5.9
BASLW	8	1	18.7	7.2	3.0	25.5	22.5	52.0
SHOULDRW	8	1	30.2	2.5	27.3	34.0	6.7	6.2
JUNCW	9	0	21.5	2.8	16.9	26.5	9.6	8.0
HAFTL	8	1	8.3	1.2	6.9	10.2	3.3	1.4

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Cypress Creek					
WEIGHT	3	20	17.7	6.7	10.0	22.3	12.3	45.3
LENGTH	5	18	50.3	3.9	45.3	54.9	9.6	14.9
WIDTH	12	11	38.8	5.3	31.1	49.0	17.9	27.8
THK	11	12	9.7	1.2	8.7	12.4	3.7	1.5
BASLW	17	6	21.3	4.8	12.4	29.5	17.1	23.5
SHOULDRW	12	11	37.2	5.2	30.0	47.2	17.2	27.4
JUNCW	22	1	21.6	4.2	14.1	29.5	15.4	17.9
HAFTL	16	7	8.8	2.3	5.2	13.2	8.0	5.1
			Dalton					
WEIGHT	3	5	6.9	0.9	6.1	7.9	1.8	0.8
LENGTH	3	5	42.3	4.5	37.3	46.0	8.7	20.3
WIDTH	6	2	25.3	3.2	21.8	30.7	8.9	10.1
THK	7	1	7.9	1.3	6.1	10.3	4.2	1.6
BASLW	6	2	21.9	3.8	14.8	25.4	10.6	14.4
SHOULDRW	3	5	25.1	2.9	23.1	28.5	5.4	8.6
JUNCW	6	2	21.2	3.9	17.6	28.5	10.9	15.5
HAFTL	6	2	13.7	3.8	8.8	18.9	10.1	14.5
			Elora					
WEIGHT	2	4	12.3	1.7	11.1	13.5	2.4	2.9
LENGTH	2	4	39.9	2.5	38.2	41.7	3.5	6.1
WIDTH	4	2	32.4	5.0	26.8	37.1	10.3	24.6
THK	5	1	11.2	0.8	10.3	12.1	1.8	0.7
BASLW	5	1	14.7	2.3	11.4	17.6	6.2	5.1
SHOULDRW	4	2	30.9	4.3	25.8	35.7	9.9	18.2
JUNCW	6	0	18.8	1.2	17.5	20.8	3.3	1.5
HAFTL	5	1	10.9	2.7	7.8	14.9	7.1	7.2
			Eva					
WEIGHT	10	27	10.8	2.4	7.8	15.3	7.5	5.9
LENGTH	11	26	48.9	10.4	34.9	68.4	33.5	108.3
WIDTH	26	11	33.3	3.4	26.8	40.3	13.5	11.4
THK	27	10	9.4	1.7	6.4	15.1	8.7	3.0
BASLW	27	10	16.2	3.8	7.0	24.0	17.0	14.2
SHOULDRW	25	12	32.4	3.5	25.6	40.0	14.4	12.5
JUNCW	31	6	17.5	3.4	9.8	24.0	14.2	11.9
HAFTL	26	11	6.0	3.0	2.6	16.3	13.7	8.8

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Flint Creek				
WEIGHT	103	171	11.9	6.6	5.0	67.5	62.5	43.2
LENGTH	110	164	54.2	9.4	36.0	76.0	40.0	87.9
WIDTH	205	69	24.3	3.1	16.6	34.0	17.4	9.5
THK	196	78	10.2	1.5	6.4	14.1	7.7	2.2
BASLW	233	41	15.2	2.4	9.4	22.6	13.2	5.8
SHOULDRW	221	53	23.5	3.0	14.3	35.9	21.6	9.2
JUNCW	262	12	15.3	1.7	10.6	19.2	8.6	2.7
HAFTL	230	44	12.1	1.7	4.4	18.2	13.8	3.0
				Flint River Spike				
WEIGHT	1	0	4.5	-	4.5	4.5	0	-
LENGTH	1	0	42.0	-	42.0	42.0	0	-
WIDTH	1	0	13.5	-	13.5	13.5	0	-
THK	1	0	9.6	-	9.6	9.6	0	-
BASLW	0	1	-	-	-	-	-	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	0	1	-	-	-	-	-	-
HAFTL	0	1	-	-	-	-	-	-
				Gary				
WEIGHT	7	12	12.9	7.2	4.4	26.0	21.6	52.1
LENGTH	7	12	52.3	10.3	34.9	66.9	32.0	105.6
WIDTH	14	5	26.9	6.8	8.9	36.4	27.5	46.4
THK	12	7	10.1	2.2	7.5	14.0	6.5	4.8
BASLW	15	4	11.0	3.0	4.7	17.3	12.6	8.8
SHOULDRW	16	3	27.3	3.7	19.9	32.3	12.4	13.4
JUNCW	18	1	17.6	3.1	12.9	23.8	10.9	9.5
HAFTL	15	4	12.3	2.3	7.8	16.0	8.2	5.2
				Greenbrier				
WEIGHT	6	20	8.8	2.1	6.8	12.0	5.2	4.6
LENGTH	4	22	54.8	3.4	51.5	59.4	7.9	11.9
WIDTH	7	19	28.0	3.8	22.6	33.3	10.7	14.7
THK	10	16	7.1	0.8	5.9	8.0	2.1	0.6
BASLW	20	6	25.7	3.8	20.1	33.8	13.7	14.1
SHOULDRW	12	14	25.4	3.0	20.9	29.5	8.6	9.2
JUNCW	22	4	21.8	3.8	16.7	30.0	13.3	14.3
HAFTL	18	8	11.1	2.6	7.5	16.6	9.1	7.0

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Hardaway				
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	1	0	30.2	-	30.2	30.2	0	-
THK	1	0	8.5	-	8.5	8.5	0	-
BASLW	1	0	30.1	-	30.1	30.1	0	-
SHOULDRW	1	0	27.5	-	27.5	27.5	0	-
JUNCW	1	0	21.1	-	21.1	21.1	0	-
HAFTL	1	0	12.3	-	12.3	12.3	0	-
				Kirk Corner Notched				
WEIGHT	31	51	8.9	4.8	2.7	24.3	21.6	23.5
LENGTH	37	45	47.8	9.6	27.3	72.5	45.2	91.8
WIDTH	50	32	29.2	4.6	19.8	43.3	23.5	20.9
THK	56	26	7.8	1.9	4.6	14.1	9.5	3.5
BASLW	63	19	23.9	4.2	15.7	33.4	17.7	17.3
SHOULDRW	47	35	28.4	4.5	19.5	42.0	22.5	20.2
JUNCW	72	10	18.9	2.8	11.9	27.8	15.9	7.8
HAFTL	58	24	9.4	2.3	5.3	14.9	9.6	5.3
				Late Woodland/Mississippian Small Triangular				
WEIGHT	86	165	1.3	1.8	0.1	13.1	13.0	3.3
LENGTH	80	171	20.5	4.4	11.0	31.1	20.1	19.5
WIDTH	205	46	15.0	2.9	3.7	25.6	21.9	8.2
THK	195	56	4.1	1.6	2.2	16.6	14.4	2.7
BASLW	196	55	15.0	2.3	8.8	22.3	13.5	5.4
SHOULDRW	0	251	-	-	-	-	-	-
JUNCW	0	251	-	-	-	-	-	-
HAFTL	0	251	-	-	-	-	-	-
				Ledbetter/Pickwick				
WEIGHT	6	40	23.8	8.2	14.0	36.0	22.0	67.6
LENGTH	9	37	69.1	17.2	52.9	109.9	57.0	296.2
WIDTH	20	26	35.2	4.1	30.2	47.6	17.4	16.6
THK	20	26	10.2	1.3	8.4	12.4	4.0	1.6
BASLW	41	5	15.7	2.9	9.0	21.8	12.8	8.5
SHOULDRW	30	16	34.1	5.6	21.5	51.2	29.7	31.3
JUNCW	44	2	19.6	3.5	9.9	26.1	16.2	12.6
HAFTL	39	7	12.6	1.7	8.1	16.4	8.3	3.0

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Limestone				
WEIGHT	0	2	-	-	-	-	-	-
LENGTH	0	2	-	-	-	-	-	-
WIDTH	0	2	-	-	-	-	-	-
THK	1	1	11.3	-	11.3	11.3	0	-
BASLW	2	0	16.4	1.8	15.1	17.7	2.6	3.4
SHOULDRW	0	2	-	-	-	-	-	-
JUNCW	2	0	17.7	2.3	16.1	19.4	3.3	5.4
HAFTL	2	0	12.2	0	12.2	12.2	0	0
				Little Bear Creek				
WEIGHT	75	217	12.3	4.5	4.7	30.0	25.3	20.5
LENGTH	78	214	56.9	9.2	32.3	80.5	48.2	84.7
WIDTH	183	109	25.8	3.7	18.0	35.8	17.8	13.3
THK	167	125	10.1	1.8	6.2	16.1	9.9	3.3
BASLW	243	49	13.4	2.8	5.4	25.7	20.3	7.6
SHOULDRW	212	80	25.0	3.6	18.0	35.6	17.6	13.0
JUNCW	272	20	16.1	2.4	9.2	23.4	14.2	5.5
HAFTL	229	63	12.5	1.9	7.2	19.9	12.7	3.5
				McCorkle Stem				
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	1	0	6.4	-	6.4	6.4	0	-
BASLW	1	0	19.4	-	19.4	19.4	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	1	0	18.7	-	18.7	18.7	0	-
HAFTL	1	0	11.6	-	11.6	11.6	0	-
				McIntire				
WEIGHT	12	18	15.1	4.9	9.1	25.3	16.2	23.6
LENGTH	14	16	56.9	6.8	46.4	68.2	21.8	45.6
WIDTH	23	7	34.4	4.8	24.2	45.3	21.1	22.8
THK	22	8	10.1	1.8	7.6	14.5	6.9	3.2
BASLW	29	1	21.3	2.9	16.5	26.6	10.1	8.2
SHOULDRW	24	6	33.6	4.2	26.3	44.0	17.7	17.8
JUNCW	29	1	21.0	3.7	10.4	31.3	20.9	14.0
HAFTL	28	2	12.0	2.9	6.3	17.2	10.9	8.5

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Morrow Mountain					
WEIGHT	10	27	10.8	3.4	6.8	17.0	10.2	11.7
LENGTH	14	23	50.0	7.9	35.2	65.1	29.9	61.7
WIDTH	25	12	28.6	4.2	20.6	36.4	15.8	17.4
THK	30	7	8.5	1.6	5.6	12.8	7.2	2.6
BASLW	27	10	15.5	4.0	8.4	22.8	14.4	15.7
SHOULDRW	24	13	28.4	4.0	21.5	36.3	14.8	16.2
JUNCW	30	7	16.9	3.4	7.8	22.8	15.0	11.3
HAFTL	22	15	7.6	3.2	3.0	15.4	12.4	10.4
			Morrow Mountain Rounded Base					
WEIGHT	0	4	-	-	-	-	-	-
LENGTH	1	3	50.3	-	50.3	50.3	0	-
WIDTH	2	2	32.8	0.1	32.8	32.9	0.1	0
THK	2	2	8.0	3.3	5.7	10.4	4.7	11.0
BASLW	4	0	24.8	8.7	17.0	32.8	15.8	76.2
SHOULDRW	2	2	29.9	3.4	27.5	32.3	4.8	11.5
JUNCW	2	2	19.3	2.5	17.6	21.1	3.5	6.1
HAFTL	2	2	8.5	4.6	5.3	11.8	6.5	21.1
			Morrow Mountain Stright Base					
WEIGHT	6	10	11.5	1.5	10.0	14.0	4.0	2.1
LENGTH	8	8	47.2	4.0	42.0	52.6	10.6	16.3
WIDTH	13	3	32.8	3.5	25.0	37.5	12.5	12.1
THK	13	3	8.6	1.4	6.5	11.0	4.5	2.1
BASLW	11	5	13.9	4.1	9.1	23.3	14.2	16.8
SHOULDRW	14	2	31.6	3.5	24.4	37.3	12.9	12.3
JUNCW	16	0	18.1	3.0	14.1	23.3	9.2	9.1
HAFTL	11	5	7.3	1.3	5.0	8.9	3.9	1.6
			Mud Creek					
WEIGHT	3	6	7.2	4.6	4.4	12.5	8.1	20.8
LENGTH	3	6	45.2	7.1	38.4	52.6	14.2	50.6
WIDTH	4	5	20.6	3.5	17.2	25.5	8.3	12.2
THK	5	4	8.4	1.4	6.2	9.9	3.7	1.9
BASLW	8	1	15.1	3.3	9.8	19.3	9.5	10.8
SHOULDRW	6	3	19.0	3.1	15.3	23.0	7.7	9.5
JUNCW	8	1	14.2	2.5	11.0	19.0	8.0	6.1
HAFTL	7	2	11.9	1.4	9.8	14.4	4.6	2.1

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Plevna				
WEIGHT	1	3	17.2	-	17.2	17.2	0	-
LENGTH	1	3	59.0	-	59.0	59.0	0	-
WIDTH	1	3	38.8	-	38.8	38.8	0	-
THK	2	2	8.0	0.6	7.6	8.4	0.8	0.3
BASLW	3	1	28.9	4.4	25.3	33.8	8.5	19.3
SHOULDRW	3	1	34.3	5.3	28.4	38.6	10.2	27.8
JUNCW	3	1	23.1	4.7	19.0	28.3	9.3	22.4
HAFTL	3	1	10.3	0.3	9.9	10.5	0.6	0.1
				Quad				
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	0	1	-	-	-	-	-	-
BASLW	1	0	26.0	-	26.0	26.0	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	0	1	-	-	-	-	-	-
HAFTL	0	1	-	-	-	-	-	-
				Residual Side-Notched				
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	0	1	-	-	-	-	-	-
BASLW	1	0	17.7	-	17.7	17.7	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	0	1	-	-	-	-	-	-
HAFTL	0	1	-	-	-	-	-	-
				Residual Stemmed				
WEIGHT	46	225	10.6	4.4	1.4	27.4	26.0	19.5
LENGTH	62	209	47.8	9.4	25.5	77.1	51.6	89.1
WIDTH	135	136	26.8	4.6	15.3	37.7	22.4	21.0
THK	147	124	9.2	1.9	4.8	14.5	9.7	3.5
BASLW	172	99	16.2	4.3	4.3	34.8	30.5	18.5
SHOULDRW	137	134	26.7	4.7	9.0	43.3	34.3	22.4
JUNCW	211	60	18.2	3.3	10.7	35.0	24.3	10.8
HAFTL	143	128	11.0	4.5	3.4	53.9	50.5	20.3

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Residual Triangular				
WEIGHT	16	7	9.4	2.9	6.2	17.3	11.1	8.6
LENGTH	19	4	43.3	5.4	36.2	54.8	18.6	28.9
WIDTH	23	0	28.5	8.8	15.1	59.1	44.0	77.8
THK	21	2	8.3	1.4	6.2	10.9	4.7	1.9
BASLW	21	2	25.6	6.5	14.3	43.4	29.1	41.9
SHOULDRW	0	23	-	-	-	-	-	-
JUNCW	0	23	-	-	-	-	-	-
HAFTL	0	23	-	-	-	-	-	-
				Savannah River				
WEIGHT	1	3	15.9	-	15.9	15.9	0	-
LENGTH	3	1	63.2	3.2	59.9	66.2	6.3	10.0
WIDTH	2	2	25.5	1.3	24.6	26.5	1.9	1.8
THK	4	0	10.7	0.6	9.9	11.3	1.4	0.4
BASLW	2	2	17.1	2.7	15.2	19.0	3.8	7.2
SHOULDRW	2	2	25.0	0.7	24.5	25.5	1.0	0.5
JUNCW	4	0	20.7	0.5	20.0	21.1	1.1	0.3
HAFTL	2	2	13.3	5.3	9.5	17.0	7.5	28.1
				Small Unfinished Triangular				
WEIGHT	15	12	3.0	1.3	0.6	4.7	4.1	1.6
LENGTH	14	13	25.6	3.8	19.0	31.4	12.4	14.5
WIDTH	24	3	18.1	2.9	11.6	22.9	11.3	8.5
THK	25	2	7.8	2.3	2.8	11.2	8.4	5.2
BASLW	25	2	16.4	3.2	10.6	22.8	12.2	10.2
SHOULDRW	1	26	17.6	-	17.6	17.6	0	-
JUNCW	1	26	15.4	-	15.4	15.4	0	-
HAFTL	1	26	10.2	-	10.2	10.2	0	-
				Swan Lake				
WEIGHT	1	1	7.0	-	7.0	7.0	0	-
LENGTH	1	1	43.0	-	43.0	43.0	0	-
WIDTH	1	1	17.7	-	17.7	17.7	0	-
THK	2	0	7.8	1.1	7.0	8.6	1.6	1.3
BASLW	1	1	17.2	-	17.2	17.2	0	-
SHOULDRW	1	1	17.2	-	17.2	17.2	0	-
JUNCW	1	1	14.6	-	14.6	14.6	0	-
HAFTL	1	1	9.1	-	9.1	9.1	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Sykes-White Springs				
WEIGHT	27	104	12.0	4.5	6.5	28.0	21.5	20.1
LENGTH	31	100	49.9	7.7	35.9	68.3	32.4	59.7
WIDTH	86	45	30.6	3.2	22.4	38.2	15.8	10.0
THK	58	73	8.7	1.7	6.1	13.2	7.1	3.0
BASLW	95	36	21.0	3.8	13.8	33.9	20.1	14.7
SHOULDRW	97	34	29.3	3.3	20.5	37.7	17.2	11.1
JUNCW	120	11	21.8	3.4	12.5	33.2	20.7	11.5
HAFTL	93	38	8.2	1.8	4.5	13.5	9.0	3.4
				Tombigbee Stemmed				
WEIGHT	3	6	8.0	1.3	6.7	9.2	2.5	1.6
LENGTH	4	5	45.0	4.2	40.6	50.6	10.0	18.0
WIDTH	8	1	23.3	3.0	19.4	28.0	8.6	9.1
THK	7	2	8.8	1.0	7.0	10.2	3.2	1.0
BASLW	9	0	11.8	2.2	8.5	16.4	7.9	4.7
SHOULDRW	6	3	23.9	2.6	20.1	27.9	7.8	6.8
JUNCW	7	2	15.0	2.1	12.3	17.2	4.9	4.5
HAFTL	7	2	11.1	1.4	9.2	12.6	3.4	1.8
				Vaughn				
WEIGHT	3	7	14.8	6.7	10.1	22.4	12.3	44.4
LENGTH	5	5	41.5	6.4	34.0	48.9	14.9	41.3
WIDTH	9	1	29.4	2.6	26.8	33.4	6.6	6.5
THK	9	1	11.2	1.4	8.5	13.2	4.7	1.9
BASLW	5	5	19.7	2.7	15.7	22.6	6.9	7.4
SHOULDRW	9	1	28.7	2.5	26.1	32.3	6.2	6.4
JUNCW	8	2	22.6	1.5	19.9	24.3	4.4	2.4
HAFTL	5	5	11.7	2.3	7.7	13.3	5.6	5.2
				Wade				
WEIGHT	0	3	-	-	-	-	-	-
LENGTH	0	3	-	-	-	-	-	-
WIDTH	1	2	28.6	-	28.6	28.6	0	-
THK	2	1	8.9	2.2	7.4	10.5	3.1	4.8
BASLW	2	1	14.8	0.3	14.6	15.0	0.4	0.1
SHOULDRW	1	2	28.3	-	28.3	28.3	0	-
JUNCW	3	0	16.4	1.7	15.3	18.4	3.1	2.9
HAFTL	2	1	10.8	0.1	10.7	10.9	0.2	0

* N MISS = the number of specimens with measurements missing due to breakage.

Table 4.3. Measurement Summary Statistics for Bifaces.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Ovoid Biface Blade - Flake								
WEIGHT	15	1	17.6	9.3	2.7	32.2	29.5	86.2
LENGTH	15	1	52.0	11.9	31.0	75.5	44.5	141.6
WIDTH	16	0	32.2	6.2	19.3	40.7	21.1	38.6
THK	16	0	11.2	2.5	6.5	15.3	8.8	6.4
Ovoid Biface Blade - Other								
WEIGHT	12	3	22.7	8.8	6.8	36.5	29.7	77.6
LENGTH	13	2	58.7	13.4	39.3	88.1	48.8	180.0
WIDTH	14	1	35.8	7.5	22.5	48.7	26.2	56.8
THK	15	0	11.1	2.0	7.9	14.2	6.3	3.9
Triangular Biface Blade - Flake								
WEIGHT	25	11	17.0	7.6	5.6	34.2	28.6	58.4
LENGTH	28	8	56.3	10.1	38.6	87.6	49.0	102.5
WIDTH	32	4	29.4	7.8	4.5	42.9	38.4	61.1
THK	36	0	10.1	2.1	5.3	15.0	9.7	4.4
Triangular Biface Blade - Other								
WEIGHT	45	38	19.1	10.1	4.6	57.4	52.8	102.8
LENGTH	49	34	57.9	11.7	32.2	83.3	51.1	137.6
WIDTH	75	8	32.7	7.3	22.6	72.8	50.2	53.2
THK	73	10	11.0	2.5	6.3	20.5	14.2	6.4
Narrow Triangular Biface Blade - Flake								
WEIGHT	10	1	19.6	5.4	13.1	28.2	15.1	28.7
LENGTH	9	2	63.2	5.5	55.9	71.1	15.2	30.2
WIDTH	11	0	26.1	6.8	13.6	40.0	26.4	45.6
THK	11	0	11.6	1.7	8.8	14.2	5.4	2.8
Narrow Triangular Biface Blade - Other								
WEIGHT	6	2	14.2	5.0	9.4	22.6	13.2	24.8
LENGTH	6	2	73.5	41.1	41.6	154.9	113.3	1690.7
WIDTH	8	0	21.9	2.0	19.3	25.6	6.3	3.8
THK	7	1	10.5	1.5	8.4	12.4	4.0	2.3

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Expanding Triangular Biface Blade - Flake					
WEIGHT	2	2	20.0	8.1	14.3	25.8	11.5	66.1
LENGTH	2	2	59.4	9.5	52.7	66.1	13.4	89.8
WIDTH	4	0	30.3	5.9	25.3	38.5	13.2	34.8
THK	4	0	11.6	1.4	10.7	13.7	3.0	2.0
ELEML	4	0	38.9	9.6	27.0	49.0	22.0	91.4
			Expanding Triangular Biface Blade - Other					
WEIGHT	1	1	20.6	-	20.6	20.6	0	-
LENGTH	1	1	51.7	-	51.7	51.7	0	-
WIDTH	1	1	31.3	-	31.3	31.3	0	-
THK	2	0	9.9	1.9	8.6	11.3	2.7	3.6
ELEML	0	2	-	-	-	-	-	-
			Broad Based Triangular Biface Blade - Flake					
WEIGHT	1	0	15.8	-	15.8	15.8	0	-
LENGTH	1	0	51.0	-	51.0	51.0	0	-
WIDTH	1	0	36.0	-	36.0	36.0	0	-
THK	1	0	10.0	-	10.0	10.0	0	-
BASLW	1	0	34.0	-	34.0	34.0	0	-
			Broad Based Triangular Biface Blade - Other					
WEIGHT	13	3	16.8	6.6	6.6	28.0	21.4	43.2
LENGTH	14	2	49.2	6.8	38.8	58.9	20.1	46.4
WIDTH	13	3	33.8	9.2	8.1	45.2	37.1	83.9
THK	15	1	12.0	8.3	6.4	40.9	34.5	68.2
BASLW	12	4	34.0	4.5	26.5	42.0	15.5	20.7

Table 4.4. Measurement Summary Statistics for Preforms.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Preform 1 - Cobble					
WEIGHT	34	0	57.5	34.1	11.7	153.7	142.0	1163.2
LENGTH	34	0	58.3	16.6	15.7	92.5	76.8	274.5
WIDTH	34	0	42.2	9.4	23.0	58.1	35.1	88.4
THK	34	0	24.0	6.4	12.4	39.2	26.8	40.9
			Preform 1 - Flake					
WEIGHT	68	6	25.8	12.6	7.3	66.5	59.2	159.8
LENGTH	67	7	49.4	9.5	28.0	77.7	49.7	90.6
WIDTH	73	1	36.2	8.1	20.7	56.8	36.1	65.0
THK	70	4	15.4	3.8	8.6	24.8	16.2	14.3
			Preform 1 - Indeterminate					
WEIGHT	110	18	38.2	41.1	7.4	348.2	340.8	1686.8
LENGTH	115	13	52.2	12.4	12.8	83.8	71.0	154.0
WIDTH	122	6	37.2	8.7	20.0	64.6	44.6	76.3
THK	121	7	19.3	5.4	9.5	38.3	28.8	28.9
			Preform 2 - Cobble					
WEIGHT	4	1	43.7	12.1	30.4	55.5	25.1	145.3
LENGTH	5	0	61.4	4.5	53.5	64.9	11.4	20.5
WIDTH	5	0	42.5	7.2	33.0	52.6	19.6	51.4
THK	5	0	21.2	3.6	17.8	25.4	7.6	12.7
			Preform 2 - Flake					
WEIGHT	73	17	20.4	10.9	4.2	59.0	54.8	119.2
LENGTH	74	16	51.7	10.8	29.7	75.6	45.9	117.4
WIDTH	84	6	32.3	7.4	17.4	55.5	38.1	54.2
THK	84	6	13.3	3.5	7.4	27.7	20.3	12.5

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Preform 2 - Indeterminate								
WEIGHT	112	32	25.6	16.8	2.8	90.3	87.5	281.7
LENGTH	111	33	53.8	12.9	26.3	92.5	66.2	165.6
WIDTH	135	9	33.4	7.9	15.4	57.9	42.5	62.9
THK	135	9	14.9	5.3	1.7	44.0	42.3	28.1
Quarry Blade								
WEIGHT	12	0	44.7	10.6	25.4	61.4	36.0	112.7
LENGTH	12	0	109.8	9.2	86.3	121.2	34.9	83.8
WIDTH	12	0	42.8	4.3	35.1	47.9	12.8	18.2
THK	12	0	9.5	1.6	7.4	12.6	5.2	2.4

Table 4.5. Measurement Summary Statistics for Cores.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				90° - Unifacial				
WEIGHT	62	0	112.8	97.3	6.0	540.7	534.7	9476.3
LENGTH	62	0	60.8	17.0	24.1	115.1	91.0	290.0
WIDTH	62	0	47.3	13.6	21.6	82.8	61.2	185.7
THK	62	0	33.7	11.0	12.3	62.1	49.8	121.7
				90° - Bifacial				
WEIGHT	3	0	94.7	7.7	87.0	102.3	15.3	58.5
LENGTH	3	0	64.5	7.6	55.7	69.0	13.3	57.7
WIDTH	3	0	52.2	10.5	44.6	64.2	19.6	110.6
THK	3	0	32.8	1.7	30.9	34.0	3.1	2.8
				180° - Unifacial Opposing				
WEIGHT	14	0	91.9	86.1	9.7	360.0	350.3	7413.1
LENGTH	14	0	56.4	20.4	3.8	88.1	84.3	416.1
WIDTH	14	0	44.4	13.5	18.8	70.4	51.6	181.5
THK	14	0	31.1	12.5	13.0	62.4	49.4	155.0
				180° - Bifacial Opposing				
WEIGHT	2	0	16.3	5.7	12.3	20.4	8.1	32.8
LENGTH	2	0	32.7	1.3	31.8	33.7	1.9	1.8
WIDTH	2	0	27.0	8.6	21.0	33.1	12.1	73.2
THK	2	0	20.7	2.4	19.0	22.4	3.4	5.8
				180° - Unifacial Adjacent				
WEIGHT	58	0	88.6	120.2	8.4	926.6	918.2	14450.5
LENGTH	58	0	59.3	13.7	33.6	126.2	92.6	187.7
WIDTH	58	0	45.5	13.0	25.5	102.7	77.2	170.0
THK	58	0	30.5	9.5	13.6	56.7	43.1	90.2
				180° - Bifacial Adjacent				
WEIGHT	14	0	104.6	62.9	19.3	232.6	213.3	3959.6
LENGTH	14	0	62.1	12.9	36.6	85.9	49.3	167.2
WIDTH	14	0	45.8	11.3	25.8	66.7	40.9	127.4
THK	14	0	34.9	11.0	14.9	48.5	33.6	120.3

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				270° - Unifacial				
WEIGHT	27	0	68.9	63.3	9.4	283.7	274.3	4004.6
LENGTH	27	0	50.5	14.0	32.1	80.8	48.7	194.6
WIDTH	27	0	42.2	11.6	23.4	72.4	49.0	133.9
THK	27	0	28.4	9.3	13.5	54.6	41.1	86.3
				270° - Bifacial				
WEIGHT	9	0	47.3	28.5	11.0	92.8	81.8	814.0
LENGTH	9	0	47.3	10.3	30.0	63.0	33.0	106.3
WIDTH	9	0	37.6	11.5	22.8	56.8	34.0	131.7
THK	9	0	26.0	5.5	19.1	35.4	16.3	30.1
				360° - Unifacial				
WEIGHT	19	0	53.0	42.4	10.4	158.0	147.6	1798.4
LENGTH	19	0	50.0	11.4	29.8	71.0	41.2	128.9
WIDTH	19	0	39.8	10.0	19.3	56.2	36.9	100.8
THK	19	0	25.2	8.8	13.0	43.4	30.4	77.6
				360° - Bifacial				
WEIGHT	17	0	90.3	81.1	4.5	269.0	264.5	6571.0
LENGTH	17	0	55.6	18.4	24.6	92.4	67.8	340.0
WIDTH	17	0	45.1	15.4	22.8	76.3	53.5	235.8
THK	17	0	29.2	9.3	10.6	45.2	34.6	86.0
				Bipolar Core				
WEIGHT	12	0	7.7	5.7	1.0	17.4	16.4	32.5
LENGTH	12	0	25.3	11.0	2.7	49.7	47.0	120.0
WIDTH	12	0	19.7	6.0	8.1	26.2	18.1	36.5
THK	12	0	13.0	5.9	5.4	22.6	17.2	35.2
				Blade Core				
WEIGHT	1	0	151.4	-	151.4	151.4	0	-
LENGTH	1	0	67.9	-	67.9	67.9	0	-
WIDTH	1	0	50.9	-	50.9	50.9	0	-
THK	1	0	41.9	-	41.9	41.9	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Microblade Core				
WEIGHT	10	0	6.1	3.3	2.0	12.9	10.9	11.1
LENGTH	10	0	25.2	7.7	14.0	41.7	27.7	60.0
WIDTH	10	0	19.4	4.1	11.2	25.6	14.4	17.2
THK	10	0	15.2	3.8	9.5	22.2	12.7	14.7
				Core Other				
WEIGHT	46	0	95.9	102.2	2.2	589.4	587.2	10451.0
LENGTH	46	0	55.9	19.5	0	122.0	122.0	378.7
WIDTH	46	0	44.7	14.8	13.5	83.9	70.4	219.0
THK	46	0	31.7	11.3	11.0	61.6	50.6	126.8

Table 4.6. Measurement Summary Statistics for Scrapers.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Uniface Side Scraper on Blade/Blade-Like Flake								
WEIGHT	19	0	8.8	5.5	1.0	17.6	16.6	30.6
LENGTH	19	0	48.5	16.3	20.5	81.7	61.2	264.1
WIDTH	19	0	24.3	8.7	9.0	43.0	34.0	75.0
THK	19	0	7.8	2.8	3.8	15.8	12.0	8.0
Uniface End Scraper on Blade/Blade-Like Flake								
WEIGHT	7	0	4.7	2.8	2.8	10.9	8.1	8.1
LENGTH	7	0	31.0	7.1	22.0	39.0	17.0	50.5
WIDTH	7	0	22.5	6.6	16.4	32.8	16.4	43.4
THK	7	0	7.7	2.1	5.2	10.5	5.3	4.4
Uniface Side-End Scraper on Blade/Blade-Like Flake								
WEIGHT	6	0	3.9	3.2	0.8	10.2	9.4	10.5
LENGTH	6	0	28.8	10.4	18.3	45.3	27.0	107.7
WIDTH	6	0	20.3	4.7	12.9	26.0	13.1	22.1
THK	6	0	5.3	1.9	3.2	8.8	5.6	3.6
Uniface Side Scraper on Expanding Flake								
WEIGHT	56	0	7.9	10.1	0.6	72.2	71.6	102.1
LENGTH	56	0	32.2	10.2	14.8	66.0	51.2	104.3
WIDTH	55	1	29.2	9.2	12.3	53.3	41.0	84.9
THK	56	0	8.6	5.2	2.8	38.1	35.3	27.4
Uniface End Scraper on Expanding Flake								
WEIGHT	77	0	5.6	4.7	0.3	24.6	24.3	21.8
LENGTH	77	0	29.4	10.4	4.4	57.4	53.0	108.4
WIDTH	77	0	25.9	7.2	5.7	41.9	36.2	52.5
THK	77	0	7.0	2.6	2.6	16.3	13.7	6.5
Uniface Side-End Scraper on Expanding Flake								
WEIGHT	43	0	6.6	5.3	1.2	27.6	26.4	28.2
LENGTH	42	1	32.5	9.6	19.4	62.4	43.0	91.5
WIDTH	43	0	26.5	7.6	14.9	53.2	38.3	57.7
THK	43	0	7.2	2.7	1.5	16.3	14.8	7.5

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Uniface Side Scraper on Other Flake					
WEIGHT	136	1	7.2	8.8	0.3	55.5	55.2	77.4
LENGTH	134	3	30.8	11.0	11.4	61.0	49.6	121.1
WIDTH	136	1	25.3	9.3	7.7	56.9	49.2	86.4
THK	135	2	8.1	4.2	2.9	23.2	20.3	18.1
			Uniface End Scraper on Other Flake					
WEIGHT	89	0	6.7	7.4	0.6	32.6	32.0	54.5
LENGTH	88	1	27.7	11.6	6.3	61.4	55.1	135.5
WIDTH	89	0	26.4	8.3	13.6	51.2	37.6	68.9
THK	89	0	8.1	4.3	2.9	22.8	19.9	18.4
			Uniface Side-End Scraper on Other Flake					
WEIGHT	63	1	6.4	10.1	0.8	74.9	74.1	101.4
LENGTH	62	2	26.4	10.4	9.5	54.3	44.8	109.1
WIDTH	63	1	24.6	8.2	11.0	61.6	50.6	66.4
THK	63	1	7.4	3.7	2.3	24.4	22.1	13.9
			Uniface End Scraper on Thermal Spall					
WEIGHT	5	0	19.6	15.4	4.0	41.0	37.0	238.6
LENGTH	4	1	39.6	14.6	26.1	56.7	30.6	213.9
WIDTH	4	1	28.8	5.8	23.8	34.8	11.0	34.0
THK	4	1	12.2	3.6	9.5	17.2	7.7	13.0
			Uniface Side Scraper on Thermal Spall					
WEIGHT	2	0	18.0	18.4	5.0	31.0	26.0	338.0
LENGTH	2	0	40.8	13.1	31.5	50.0	18.5	171.1
WIDTH	2	0	28.5	10.0	21.5	35.6	14.1	99.4
THK	2	0	14.8	3.5	12.4	17.3	4.9	12.0
			Uniface Side-End Scraper on Thermal Spall					
WEIGHT	1	0	4.9	-	4.9	4.9	0	-
LENGTH	1	0	29.7	-	29.7	29.7	0	-
WIDTH	1	0	24.2	-	24.2	24.2	0	-
THK	1	0	8.2	-	8.2	8.2	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Biface Hafted End Scraper								
WEIGHT	9	0	8.4	4.3	3.4	16.4	13.0	18.6
LENGTH	9	0	35.8	12.9	19.7	59.3	39.6	166.2
WIDTH	9	0	25.5	3.4	20.0	30.4	10.4	11.3
THK	9	0	8.9	1.7	6.4	11.5	5.1	2.8
Uniface Cobble Scraper								
WEIGHT	6	0	46.0	45.5	2.0	99.4	97.4	2070.6
LENGTH	6	0	44.4	21.8	19.0	74.2	55.2	476.2
WIDTH	6	0	35.4	19.6	13.6	56.4	42.8	382.4
THK	6	0	18.6	11.1	7.4	35.6	28.2	124.1
Biface Cobble Scraper								
WEIGHT	1	0	3.2	-	3.2	3.2	0	-
LENGTH	1	0	27.2	-	27.2	27.2	0	-
WIDTH	1	0	17.4	-	17.4	17.4	0	-
THK	1	0	6.7	-	6.7	6.7	0	-
Scraper on Biface (Recycled)								
WEIGHT	48	0	10.0	8.9	1.7	37.9	36.2	78.5
LENGTH	48	0	35.2	11.0	18.4	65.6	47.2	120.3
WIDTH	48	0	26.5	8.8	12.5	52.3	39.8	77.5
THK	48	0	9.8	3.7	5.5	24.3	18.8	13.6
Scraper on Core (Recycled)								
WEIGHT	10	0	53.9	73.7	1.4	249.8	248.4	5434.1
LENGTH	10	0	51.2	17.3	23.5	85.7	62.2	300.6
WIDTH	10	0	37.7	14.0	22.4	68.5	46.1	195.9
THK	10	0	24.5	9.3	16.1	47.5	31.4	86.5
Notched Flake/Spokeshave								
WEIGHT	100	0	4.8	7.5	0.4	70.7	70.3	56.8
LENGTH	100	0	29.3	10.6	2.2	62.5	60.3	113.2
WIDTH	100	0	24.0	7.8	4.7	47.3	42.6	60.2
THK	100	0	7.1	4.6	2.5	35.7	33.2	21.2

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Scraper Other								
WEIGHT	10	0	14.5	27.1	0.1	91.0	90.9	735.3
LENGTH	10	0	31.8	16.7	11.4	73.0	61.6	278.2
WIDTH	10	0	27.2	10.6	12.5	48.4	35.9	112.5
THK	10	0	10.3	7.0	2.6	28.5	25.9	49.4
Ovoid Biface Scraper								
WEIGHT	1	0	93.5	-	93.5	93.5	0	-
LENGTH	1	0	64.5	-	64.5	64.5	0	-
WIDTH	1	0	55.0	-	55.0	55.0	0	-
THK	1	0	20.8	-	20.8	20.8	0	-
Biface Scraper on a Flake								
WEIGHT	13	0	7.8	6.2	1.1	21.4	20.3	38.7
LENGTH	13	0	33.4	10.7	17.0	50.8	33.8	115.3
WIDTH	13	0	26.8	10.1	15.2	53.0	37.8	101.5
THK	13	0	7.5	2.7	3.0	11.7	8.7	7.2
Graver/Scraper								
WEIGHT	3	0	8.0	6.1	2.5	14.6	12.1	37.5
LENGTH	3	0	31.0	4.2	26.2	33.9	7.7	17.7
WIDTH	3	0	26.2	10.8	16.4	37.8	21.4	117.1
THK	3	0	11.7	5.0	8.1	17.4	9.3	25.1
Uniface Hafted End Scraper								
WEIGHT	8	0	6.8	2.8	3.4	10.4	7.0	7.6
LENGTH	8	0	30.8	6.6	21.2	38.8	17.6	43.2
WIDTH	8	0	26.5	6.1	20.0	38.5	18.5	37.0
THK	8	0	8.4	1.9	5.8	12.1	6.3	3.8
Spokeshave/Biface Side Scraper								
WEIGHT	1	0	15.4	-	15.4	15.4	0	-
LENGTH	1	0	43.3	-	43.3	43.3	0	-
WIDTH	1	0	40.0	-	40.0	40.0	0	-
THK	1	0	8.6	-	8.6	8.6	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Notched Flake/Spokeshave (Recycled)								
WEIGHT	3	0	2.7	1.5	1.2	4.1	2.9	2.1
LENGTH	3	0	27.5	4.8	23.0	32.5	9.5	22.8
WIDTH	3	0	12.8	4.7	7.6	16.7	9.1	21.8
THK	3	0	7.0	2.2	5.1	9.4	4.3	4.8
Ovoid Biface Scraper (Recycled)								
WEIGHT	1	0	3.6	-	3.6	3.6	0	-
LENGTH	1	0	22.0	-	22.0	22.0	0	-
WIDTH	1	0	20.0	-	20.0	20.0	0	-
THK	1	0	8.0	-	8.0	8.0	0	-
Hafted End Scraper (Recycled)								
WEIGHT	13	0	10.5	6.4	3.2	24.6	21.4	40.5
LENGTH	13	0	37.3	12.9	18.4	64.5	46.1	167.2
WIDTH	13	0	28.7	5.1	19.2	35.2	16.0	25.7
THK	13	0	9.3	2.8	5.7	15.2	9.5	7.7

Table 4.7. Measurement Summary Statistics for Drills, Perforators, et.c

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Shaft Drill								
WEIGHT	35	9	4.3	2.5	1.5	15.3	13.8	6.5
LENGTH	32	12	43.9	12.5	4.5	62.4	57.9	156.9
WIDTH	44	0	11.3	2.0	8.1	16.5	8.4	4.2
THK	43	1	7.9	1.6	4.8	12.0	7.2	2.5
Expanding Base Drill								
WEIGHT	48	40	6.0	5.9	2.0	42.0	40.0	34.4
LENGTH	39	49	45.7	10.2	26.8	73.8	47.0	104.8
WIDTH	87	1	19.9	6.7	2.0	44.9	42.9	45.2
THK	71	17	8.4	2.0	3.3	16.6	13.3	3.9
Stemmed Drill (Recycled)								
WEIGHT	58	44	7.0	3.2	2.3	20.0	17.7	10.0
LENGTH	46	56	50.1	13.9	6.4	86.3	79.9	193.2
WIDTH	101	1	22.3	5.2	2.1	34.3	32.2	26.8
THK	83	19	9.2	3.6	1.8	36.4	34.6	12.8
Reamer								
WEIGHT	17	1	7.8	4.4	1.0	17.7	16.7	18.9
LENGTH	16	2	42.8	13.5	24.0	68.4	44.4	183.6
WIDTH	18	0	21.8	7.1	1.6	30.3	28.7	50.0
THK	18	0	10.2	3.5	4.0	16.5	12.5	12.5
Perforator								
WEIGHT	72	2	2.5	2.1	0.6	10.1	9.5	4.4
LENGTH	72	2	26.7	7.4	2.0	44.6	42.6	55.3
WIDTH	72	2	18.0	5.8	1.4	35.4	34.0	33.1
THK	73	1	5.9	2.3	2.6	15.0	12.4	5.4
Graver								
WEIGHT	41	0	3.3	2.5	0.2	13.0	12.8	6.3
LENGTH	41	0	24.4	7.1	4.4	39.6	35.2	51.0
WIDTH	41	0	20.8	7.4	11.2	43.8	32.6	54.9
THK	41	0	5.9	2.6	2.4	14.2	11.8	6.7

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Microlith				
WEIGHT	48	3	1.6	2.4	0.3	13.0	12.7	5.9
LENGTH	48	3	20.1	6.4	3.8	32.5	28.7	40.7
WIDTH	51	0	9.0	2.7	2.8	16.9	14.1	7.4
THK	50	1	4.0	1.4	0.5	7.0	6.5	1.9
				Denticulate				
WEIGHT	9	0	7.0	6.2	1.3	18.9	17.6	39.0
LENGTH	9	0	36.5	14.8	21.2	66.2	45.0	220.4
WIDTH	9	0	21.6	9.8	10.8	33.2	22.4	95.1
THK	9	0	8.7	4.5	4.0	17.8	13.8	20.7
				Microperforator				
WEIGHT	19	0	0.4	0.2	0.1	0.8	0.7	0
LENGTH	19	0	14.5	4.2	4.3	25.0	20.7	17.7
WIDTH	19	0	10.2	3.3	1.8	17.8	16.0	10.8
THK	19	0	3.0	1.0	1.5	5.4	3.9	1.1
				Reamer (Recycled)				
WEIGHT	7	1	7.4	3.9	4.5	14.8	10.3	15.1
LENGTH	7	1	36.2	15.1	5.2	52.4	47.2	229.0
WIDTH	8	0	22.3	4.7	15.3	29.3	14.0	21.8
THK	8	0	9.1	1.3	7.3	10.9	3.6	1.6
				Perforator (Recycled)				
WEIGHT	12	3	8.0	3.7	2.5	14.3	11.8	13.6
LENGTH	12	3	38.2	7.2	24.0	51.0	27.0	52.4
WIDTH	15	0	24.1	4.7	13.7	30.8	17.1	22.3
THK	15	0	9.1	2.1	6.4	13.2	6.8	4.3

Table 4.8. Measurement Summary Statistics for Other Uniface and Biface Tools.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Uniface Chopper								
WEIGHT	24	0	171.5	150.6	43.1	618.8	575.7	22680.4
LENGTH	24	0	75.4	17.5	47.8	119.5	71.7	306.3
WIDTH	24	0	59.3	18.2	38.9	113.0	74.1	331.2
THK	24	0	32.7	10.8	16.0	57.8	41.8	116.6
Biface Chopper								
WEIGHT	65	0	192.8	158.6	33.6	1045.7	1012.1	25154.0
LENGTH	65	0	75.0	20.0	31.6	165.0	133.4	400.0
WIDTH	65	0	60.4	15.2	32.4	123.0	90.6	231.0
THK	65	0	36.5	11.4	15.4	74.2	58.8	130.0
Uniface Adze								
WEIGHT	10	0	71.8	44.1	20.5	139.2	118.7	1944.8
LENGTH	10	0	55.5	11.1	36.6	71.5	34.9	123.2
WIDTH	10	0	47.2	13.3	33.0	68.2	35.2	176.9
THK	10	0	21.9	5.7	14.2	31.0	16.8	32.5
Biface Adze								
WEIGHT	24	0	30.5	12.9	11.9	79.1	67.2	166.4
LENGTH	24	0	48.4	8.4	35.7	71.8	36.1	70.6
WIDTH	24	0	35.1	5.0	23.9	44.1	20.2	25.0
THK	24	0	17.6	3.9	10.3	29.5	19.2	15.2
Uniface Flake Knife								
WEIGHT	83	0	16.9	20.1	1.0	123.3	122.3	404.0
LENGTH	83	0	46.5	16.0	6.5	87.4	80.9	256.0
WIDTH	83	0	32.9	10.7	13.0	66.3	53.3	114.5
THK	82	1	10.1	5.5	3.2	30.5	27.3	30.3
Biface Flake Knife								
WEIGHT	87	1	15.7	12.0	2.1	74.9	72.8	144.0
LENGTH	86	2	48.6	12.7	20.2	83.6	63.4	161.3
WIDTH	87	1	32.0	9.8	2.3	56.0	53.7	96.0
THK	86	2	10.1	3.4	3.9	22.2	18.3	11.6

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Uniface Cobble Knife					
WEIGHT	6	0	34.3	24.4	12.7	80.0	67.3	595.4
LENGTH	5	1	49.3	12.2	42.3	71.0	28.7	148.8
WIDTH	6	0	36.5	7.3	26.0	48.0	22.0	53.3
THK	6	0	19.9	7.6	12.0	29.0	17.0	57.8
			Biface Cobble Knife					
WEIGHT	3	0	28.5	7.4	20.4	35.0	14.6	54.8
LENGTH	3	0	46.3	11.9	37.6	59.8	22.2	141.6
WIDTH	3	0	36.9	6.4	30.9	43.7	12.8	41.0
THK	3	0	19.6	5.1	14.4	24.5	10.1	26.0
			Biface Digging Implement					
WEIGHT	6	0	269.6	213.6	57.6	656.9	599.3	45625.0
LENGTH	6	0	84.3	19.2	57.6	109.8	52.2	368.6
WIDTH	6	0	65.8	22.3	27.2	81.6	54.4	497.3
THK	6	0	33.1	8.4	22.0	46.5	24.5	70.6
			Other					
WEIGHT	11	5	31.7	31.2	0.6	107.5	106.9	973.4
LENGTH	12	4	47.7	18.2	7.7	68.0	60.3	331.2
WIDTH	13	3	30.9	11.0	12.0	46.4	34.4	121.0
THK	16	0	14.5	7.9	5.2	31.5	26.3	62.4
			Wedge					
WEIGHT	31	0	18.1	17.3	0.9	66.9	66.0	299.3
LENGTH	30	1	38.3	16.6	14.4	69.3	54.9	275.6
WIDTH	31	0	26.5	7.7	10.1	39.4	29.3	59.3
THK	31	0	12.8	6.6	4.2	28.0	23.8	43.6
			Chipped Axe					
WEIGHT	1	0	423.4	-	423.4	423.4	0	-
LENGTH	1	0	123.2	-	123.2	123.2	0	-
WIDTH	1	0	69.5	-	69.5	69.5	0	-
THK	1	0	42.2	-	42.2	42.2	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Chopper/Hammerstone								
WEIGHT	12	0	222.7	166.5	43.6	657.1	613.5	27722.3
LENGTH	12	0	70.8	13.8	44.0	92.0	48.0	190.4
WIDTH	12	0	61.4	12.6	38.8	87.9	49.1	158.8
THK	12	0	41.8	13.2	23.4	61.3	37.9	174.2
Chisel								
WEIGHT	19	0	17.5	18.8	2.0	64.9	62.9	353.4
LENGTH	19	0	40.0	15.2	15.1	72.5	57.4	231.0
WIDTH	19	0	27.9	12.4	10.5	59.6	49.1	153.8
THK	19	0	13.9	6.0	6.4	25.0	18.6	36.0
Burinated Biface (Recycled)								
WEIGHT	5	0	3.0	1.9	1.3	5.6	4.3	3.6
LENGTH	5	0	32.0	8.4	21.9	45.0	23.1	70.6
WIDTH	5	0	13.3	5.8	8.8	22.5	13.7	33.6
THK	5	0	6.9	1.4	5.7	9.2	3.5	2.0
Adze/Chisel								
WEIGHT	7	0	49.6	52.6	10.3	163.5	153.2	2766.8
LENGTH	7	0	57.8	26.9	34.7	115.8	81.1	723.6
WIDTH	7	0	35.4	7.5	26.4	44.6	18.2	56.3
THK	7	0	20.8	8.4	11.5	33.1	21.6	70.6
Biface Knife on Thermal Spall								
WEIGHT	1	0	17.5	-	17.5	17.5	0	-
LENGTH	1	0	31.9	-	31.9	31.9	0	-
WIDTH	1	0	33.2	-	33.2	33.2	0	-
THK	1	0	14.4	-	14.4	14.4	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Piece Esquille								
WEIGHT	17	0	3.9	3.0	0.2	12.4	12.2	9.0
LENGTH	17	0	23.4	6.6	14.0	37.3	23.3	43.6
WIDTH	17	0	18.6	5.4	7.0	26.4	19.4	29.2
THK	17	0	7.4	2.6	3.1	13.4	10.3	6.8
Piece Esquille on Biface (Recycled)								
WEIGHT	5	0	4.9	2.2	3.1	8.7	5.6	4.8
LENGTH	5	0	28.1	3.7	22.8	33.0	10.2	13.7
WIDTH	5	0	18.2	4.4	12.7	24.2	11.5	19.4
THK	5	0	8.2	2.7	6.4	13.0	6.6	7.3

Table 4.9. Measurement Summary Statistics for Ground Stone.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Hammerstone				
WEIGHT	148	1	155.0	125.3	9.4	694.3	684.9	15710.8
LENGTH	148	1	63.3	16.7	31.3	119.2	87.9	278.6
WIDTH	149	0	49.5	13.3	25.5	100.3	74.8	177.3
THK	149	0	35.4	11.5	1.6	66.6	65.0	131.6
HOLEDIAM	0	149	-	-	-	-	-	-
				Anvilstone				
WEIGHT	11	0	825.0	838.4	182.6	2543.4	2360.8	702984.2
LENGTH	11	0	134.6	74.3	77.8	276.0	198.2	5518.8
WIDTH	11	0	105.3	53.5	60.9	228.0	167.1	2862.6
THK	11	0	38.3	8.0	25.4	51.3	25.9	63.4
HOLEDIAM	0	11	-	-	-	-	-	-
				Pitted Anvilstone				
WEIGHT	49	1	394.0	323.1	31.7	1283.5	1251.8	104362.5
LENGTH	49	1	94.3	23.7	48.0	149.3	101.3	560.9
WIDTH	50	0	74.3	22.5	32.7	145.0	112.3	507.3
THK	50	0	36.9	10.2	15.2	67.9	52.7	104.2
HOLEDIAM	0	50	-	-	-	-	-	-
				Hammer/Anvilstone				
WEIGHT	7	0	321.1	230.0	48.7	653.5	604.8	52917.7
LENGTH	7	0	88.0	22.1	55.4	122.2	66.8	486.2
WIDTH	7	0	64.2	16.3	47.6	94.0	46.4	265.8
THK	7	0	39.6	11.6	23.6	53.8	30.2	135.7
HOLEDIAM	0	7	-	-	-	-	-	-
				Abrader				
WEIGHT	30	0	169.9	199.9	6.7	1028.7	1022.0	39968.3
LENGTH	30	0	75.6	29.7	35.0	149.7	114.7	880.7
WIDTH	30	0	54.6	21.2	23.9	103.6	79.7	449.9
THK	30	0	25.8	9.6	9.0	48.0	39.0	92.5
HOLEDIAM	0	30	-	-	-	-	-	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Muller				
WEIGHT	25	0	310.8	200.1	106.1	1037.5	931.4	40049.7
LENGTH	25	0	87.0	21.1	54.9	129.5	74.6	447.2
WIDTH	24	1	62.4	17.4	37.5	102.8	65.3	301.7
THK	25	0	36.7	8.2	21.7	62.0	40.3	67.2
HOLEDIAM	0	25	-	-	-	-	-	-
				Mortar				
WEIGHT	15	0	730.4	711.1	147.1	2341.9	2194.8	505647.2
LENGTH	15	0	128.2	41.5	75.8	203.0	127.2	1722.6
WIDTH	15	0	105.1	35.7	56.0	168.0	112.0	1272.9
THK	15	0	35.7	17.8	14.3	81.8	67.5	316.3
HOLEDIAM	0	15	-	-	-	-	-	-
				Pestle				
WEIGHT	3	0	577.8	190.8	433.7	794.1	360.4	36388.9
LENGTH	3	0	97.8	20.0	77.0	116.9	39.9	400.2
WIDTH	3	0	73.0	5.8	67.6	79.1	11.5	33.4
THK	3	0	55.9	8.6	46.4	63.0	16.6	73.5
HOLEDIAM	0	3	-	-	-	-	-	-
				Grooved Axe				
WEIGHT	3	0	433.4	229.1	172.0	599.1	427.1	52482.0
LENGTH	3	0	100.8	20.5	77.2	114.7	37.5	422.1
WIDTH	3	0	74.6	16.9	58.7	92.3	33.6	284.7
THK	3	0	35.8	3.9	31.3	38.4	7.1	15.1
HOLEDIAM	0	3	-	-	-	-	-	-
				Gorget				
WEIGHT	1	1	8.9	-	8.9	8.9	0	-
LENGTH	1	1	32.2	-	32.2	32.2	0	-
WIDTH	2	0	30.3	12.7	21.4	39.3	17.9	160.2
THK	2	0	8.8	3.0	6.7	11.0	4.3	9.2
HOLEDIAM	2	0	8.1	0.9	7.5	8.8	1.3	0.8

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Atlatl Weight				
WEIGHT	3	3	95.6	69.2	52.4	175.5	123.1	4794.9
LENGTH	3	3	70.3	46.6	43.1	124.1	81.0	2168.3
WIDTH	3	3	37.1	8.3	28.7	45.2	16.5	68.2
THK	3	3	21.4	4.2	17.3	25.6	8.3	17.2
HOLEDIAM	6	0	11.5	3.2	6.0	15.7	9.7	10.4
				Discoidal				
WEIGHT	1	1	3.0	-	3.0	3.0	0	-
LENGTH	2	0	31.1	16.5	19.5	42.8	23.3	271.4
WIDTH	2	0	30.1	15.8	19.0	41.3	22.3	248.6
THK	1	1	5.7	-	5.7	5.7	0	-
HOLEDIAM	0	2	-	-	-	-	-	-
				Bead				
WEIGHT	22	0	4.4	4.1	0.3	20.3	20.0	17.1
LENGTH	22	0	15.5	8.7	1.1	32.1	31.0	75.6
WIDTH	22	0	13.6	4.0	5.0	19.4	14.4	15.8
THK	22	0	12.8	5.1	4.0	29.6	25.6	26.1
HOLEDIAM	20	2	5.6	1.6	2.0	7.9	5.9	2.6
				Edge Ground Cobble				
WEIGHT	2	0	329.5	319.6	103.5	555.5	452.0	102152.0
LENGTH	2	0	73.8	27.3	54.5	93.1	38.6	745.0
WIDTH	2	0	67.7	32.3	44.9	90.6	45.7	1044.2
THK	2	0	42.0	17.8	29.4	54.6	25.2	317.5
HOLEDIAM	0	2	-	-	-	-	-	-
				Muller/Pitted Anvilstone				
WEIGHT	15	0	363.9	137.9	148.2	664.2	516.0	19014.6
LENGTH	15	0	89.4	28.0	12.0	150.0	138.0	782.3
WIDTH	14	1	68.0	13.7	38.7	93.2	54.5	189.0
THK	15	0	34.6	5.8	26.6	47.7	21.1	33.6
HOLEDIAM	0	15	-	-	-	-	-	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Drill Core					
WEIGHT	12	0	1.2	0.6	0.4	2.1	1.7	0.3
LENGTH	12	0	9.8	4.0	1.8	18.6	16.8	16.0
WIDTH	12	0	9.1	1.9	5.9	11.6	5.7	3.5
THK	12	0	8.8	1.9	5.8	11.4	5.6	3.5
HOLEDIAM	0	12	-	-	-	-	-	-
			Bead Preform					
WEIGHT	12	0	4.0	2.5	1.3	8.5	7.2	6.1
LENGTH	12	0	18.2	5.0	11.4	28.2	16.8	24.9
WIDTH	12	0	13.1	5.0	1.6	20.6	19.0	24.9
THK	12	0	9.5	2.7	4.5	13.3	8.8	7.3
HOLEDIAM	0	12	-	-	-	-	-	-
			Muller/Hammerstone					
WEIGHT	4	0	206.2	119.1	66.8	338.0	271.2	14185.7
LENGTH	4	0	67.8	8.2	56.5	75.8	19.3	66.6
WIDTH	4	0	55.1	14.6	33.3	63.4	30.1	213.9
THK	4	0	37.6	10.8	22.8	46.8	24.0	116.5
HOLEDIAM	0	4	-	-	-	-	-	-
			Anvilstone/Chopper					
WEIGHT	1	0	387.3	-	387.3	387.3	0	-
LENGTH	1	0	91.3	-	91.3	91.3	0	-
WIDTH	1	0	70.1	-	70.1	70.1	0	-
THK	1	0	47.6	-	47.6	47.6	0	-
HOLEDIAM	0	1	-	-	-	-	-	-
			Abrader/Anvilstone					
WEIGHT	2	0	411.6	215.2	259.5	563.8	304.3	46299.2
LENGTH	2	0	130.5	62.9	86.0	175.0	89.0	3960.5
WIDTH	2	0	109.5	34.6	85.0	134.0	49.0	1200.5
THK	2	0	24.2	0.6	23.8	24.7	0.9	0.4
HOLEDIAM	0	2	-	-	-	-	-	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Mortar/Anvilstone					
WEIGHT	2	0	695.2	472.2	361.3	1029.1	667.8	222978.4
LENGTH	2	0	123.0	46.7	90.0	156.0	66.0	2178.0
WIDTH	2	0	97.8	16.2	86.4	109.3	22.9	262.2
THK	2	0	36.1	5.4	32.3	40.0	7.7	29.6
HOLEDIAM	0	2	-	-	-	-	-	-
			Mortar/Pitted Anvilstone					
WEIGHT	1	0	249.1	-	249.1	249.1	0	-
LENGTH	1	0	88.6	-	88.6	88.6	0	-
WIDTH	1	0	65.4	-	65.4	65.4	0	-
THK	1	0	33.0	-	33.0	33.0	0	-
HOLEDIAM	0	1	-	-	-	-	-	-
			Pitted Anvilstone/Abrader					
WEIGHT	4	0	346.6	156.8	162.0	498.4	336.4	24576.4
LENGTH	4	0	94.2	24.7	65.5	122.3	56.8	611.3
WIDTH	4	0	71.9	18.8	49.2	92.4	43.2	352.6
THK	4	0	35.3	5.3	29.3	40.6	11.3	28.5
HOLEDIAM	0	4	-	-	-	-	-	-
			Grooved Abrader/Hammerstone/Pitted Anvilstone					
WEIGHT	1	0	1152.5	-	1152.5	1152.5	0	-
LENGTH	1	0	165.0	-	165.0	165.0	0	-
WIDTH	1	0	78.0	-	78.0	78.0	0	-
THK	1	0	55.1	-	55.1	55.1	0	-
HOLEDIAM	0	1	-	-	-	-	-	-
			Awl					
WEIGHT	10	1	0.3	0.3	0.1	1.0	0.9	0.1
LENGTH	9	2	24.9	5.9	16.9	35.2	18.3	34.8
WIDTH	11		2.7	0.4	2.1	3.3	1.2	0.2
THK	11	0	2.4	0.5	1.6	3.3	1.7	0.3
HOLEDIAM	0	11	-	-	-	-	-	-

Table 4.10. Correlation of Flake Size Grade and Presence of Cortex

		221T576							221T590						T
		without cortex				with cortex			without cortex			with cortex			
LEVEL		T	1"	½"	¼"	1"	½"	¼"	1"	½"	¼"	1"	½"	¼"	
1	N	72	0	44	28	0	0	0	0	64	[illegible]	0	8	80	153
	%	0	0	100	100	0	0	0	0	89	1	0	11	99	
2	N	0	0	0	0	0	0	0	2	266	2592	5	339	1011	4215
	%	0	0	0	0	0	0	0	29	59	71	71	41	28	
3	N	92	1	28	23	0	0	0	1	140	1447	0	246	800	2634
	%	0	100	100	100	0	0	0	100	36	64	0	64	36	
4	N	357	0	36	321	0	0	0	1	34	355	2	28	39	459
	%	0	0	100	100	0	0	0	33	55	90	67	45	10	
5	N	83	1	17	65	0	0	0	0	21	224	0	28	82	355
	%	0	100	100	100	0	0	0	0	43	73	0	57	27	
6	N	69	1	9	59	0	0	0	0	8	88	2	12	31	141
	%	0	100	100	100	0	0	0	0	40	74	100	60	26	
7	N	48	0	10	38	0	0	0	2	14	136	0	15	48	215
	%	0	0	100	100	0	0	0	100	48	74	0	52	26	
8	N	8	0	4	4	0	0	0	1	14	57	1	0	0	73
	%	0	0	100	100	0	0	0	50	100	100	50	0	0	
9	N	179	2	31	146	0	0	0	0	19	154	1	24	117	315
	%	0	100	100	100	0	0	0	0	44	67	100	56	43	
10	N	196	1	40	155	0	0	0	0	23	136	0	10	30	199
	%	0	100	100	100	0	0	0	0	70	82	0	30	18	
11	N	86	0	27	59	0	0	0	0	51	234	0	21	28	334
	%	0	0	100	100	0	0	0	0	71	89	0	29	11	
12	N	13	0	5	13	0	0	0	0	12	202	2	40	156	[illegible]
	%	0	0	100	100	0	0	0	0	23	49	100	77	51	
13	N								0	31	160	0	0	0	191
	%								0	100	100	0	0	0	
14	N								1	35	121	1	0	0	158
	%								50	100	100	50	0	0	
15	N								0	16	78	1	4	7	106
	%								0	80	92	100	20	8	
16	N								0	5	64	0	6	16	91
	%								0	45	80	0	55	20	
17	N								0	10	82	0	8	7	107
	%								0	56	92	0	44	8	
18	N								0	2	2	0	0	1	5
	%								0	100	[illegible]	0	0	[illegible]	
19	N								0	0	3	0	0	0	3
	%								0	0	100	0	0	0	
Total	N	1208	6	291	911	0	0	0	8	755	6136	15	789	2453	10168
Total	%		100	100	100	0	0	0	20	54	70	80	46	30	

FIGURE 4.1

Schematic representation of processing of material remains in Phase I field excavations

Schematic Representation of Processing of Material Remains in Phase I Field Excavations

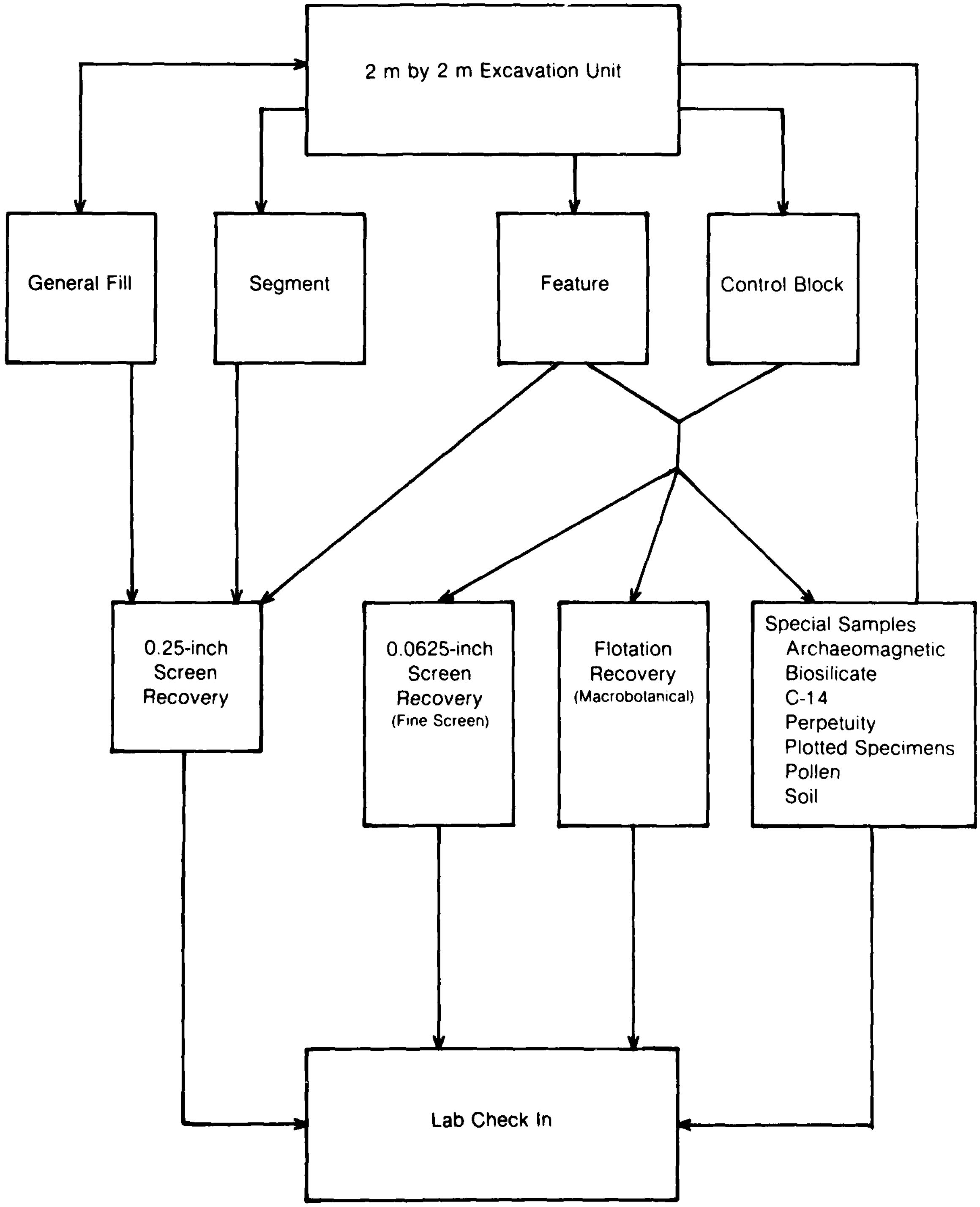
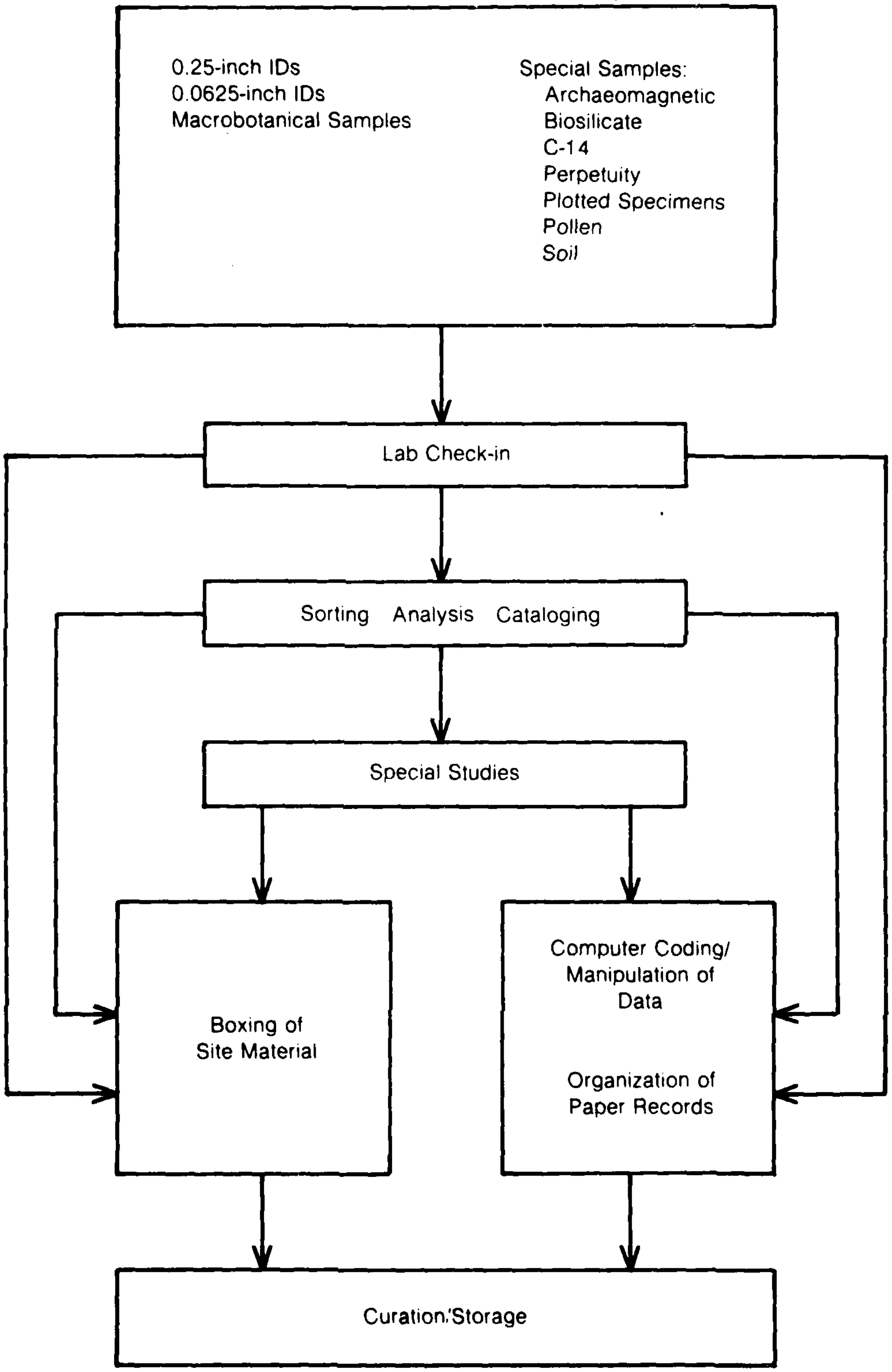


FIGURE 4.2

Schematic representation of material and information flow in Phase I laboratory

Schematic Representation of Material and Information Flow in Phase I Laboratory.



CHAPTER 5

EXCAVATIONS AT THE WALNUT SITE: 22IT539

INTRODUCTION

The Walnut site (22IT539) is a deeply stratified, multicomponent site containing diagnostic artifacts from the Early Archaic to the present. The site is a physiographic rise in the Upper Tombigbee River floodplain in northern Itawamba County, Mississippi. Accretional deposition of fluvial sediments augmented by deposition of cultural materials is responsible for the site's presence.

Intensive excavations of the Walnut site were performed for seven months in 1980 to help mitigate the adverse effects of the Tennessee-Tombigbee Waterway on the archaeological resources of the Upper Tombigbee Valley. The Walnut site is but one of eleven sites tested or intensively excavated by the University of West Florida, Office of Cultural and Archaeological Research, for the U.S. Army Corps of Engineers (Mobile) in cooperation with the Interagency Archeological Service. The following report serves as a descriptive and, to a lesser extent, interpretive report of the site, its cultural features, and the artifactual materials recovered during excavations. The following report strives toward producing a synthesis of the site components, activities, and features which will aid in planning future research. Further work awaits a more comprehensive, integrative investigation.

SITE PROJECT HISTORY

The Walnut site (22IT539) was officially recorded in 1972 (Lewis and Caldwell 1972:44), but has been known to the local inhabitants for many years, as the numerous potholes found on the site indicate. Lewis and Caldwell (1972), as well as Blakeman (1975), noted the temporally diverse materials on the site and recommended that the site be tested. Limited testing was performed on the site by Bense (1979b, 1982a). The results of this testing prompted the U.S. Army Corps of Engineers to include the site in its plans for intensive excavations.

RESEARCH RATIONAL

The Walnut site was one of the two sites (22IT539 and 22IT576) excavated simultaneously at the beginning of the project's investigations. Both faced imminent destruction by waterway construction activities and both possessed deep cultural middens which were suspected to contain predominantly Middle and Late Archaic stratified deposits. It was hoped that excavations would establish a firm foundation for determining the culture history

of the study area. Data valuable in the interpretation of resource utilization patterns was expected.

A historical perspective of the research objectives and the evolution of excavation strategies is presented in a later section of this chapter.

SITE DESCRIPTION

LOCATION

The Walnut site (22IT539) is located in northern Itawamba County, Mississippi, approximately 16.5 km due north of the county seat, Fulton. The site is situated 1.2 km southeast (118° east of north) of the present confluence of Mackeys and Big Brown Creeks, which join to form the Tombigbee River. The Pharr Mounds (Bohannon 1972) on the Natchez Trace are 4.8 km north of the site.

Legal Description

The Walnut site is in the NE/NW/SW/SE 1/4 of Section 36, Township 7S, Range 8E, and can be located on the Kirkville, Mississippi Quadrangle (USGS 7.5 minute series). The Universal Transverse Mercator Grid coordinates for the site are Zone 16, Easting 370650, Northing 3810050, and the geographic coordinates are 34°25'32"N, 88°24'18" W.

Tennessee-Tombigbee Waterway Project Setting

The site is located in the Canal Section of the Tennessee-Tombigbee Waterway. Most of the site will be buried beneath the levee in the upper reaches of the pool above Lock D (Figure 5.1). The canal will run less than 50 m to the east of the site. Walker's Road is 700 m to the north. A Tennessee Valley Authority 161 kv transmission line crosses directly over the site at an angle of 42° east of north. A transmission tower for this line is situated in the northeastern central area of the site.

Physiography

The Walnut site is in the eastern half of the modern floodplain approximately 0.9 km from the eastern valley wall and 1.4 km from

the western terrace. The Tombigbee River flows through the far western side of the floodplain.

The floodplain, as measured across the valley perpendicular to the trend of the river, is restricted to 2.5 km in the area of the site. In contrast, the area 14 km downstream near the Poplar site (22IT576) and the town of Fulton is 3.5 km across. This difference in floodplain restriction causes variation in the morphology of the Tombigbee River and its feeder streams.

The extreme upper area of the Tombigbee floodplain, which includes the Walnut site, is a relatively higher energy environment than that found downstream. This is due to the greater constriction of the floodplain and a higher stream gradient. In this high energy environment a relatively larger average size of sediment is deposited. Fluvial deposits, therefore, in this area of the floodplain are, on the average, sandier than in downstream areas.

An unnamed stream flows around and near the northeastern edge on a rambling course to the Tombigbee. The path of this stream, which generally parallels the Tombigbee, resembles a Yazoo type tributary (Fred Nials, personal communication 1980). This type of feeder stream parallels the major stream, but is kept from joining it by a natural levee system built by the larger stream.

The modern stream course near the site is not necessarily the same as that of aboriginal times. The vegetation associated with the stream in the area of the site suggests that it has been flowing in its present course for at least 100 years. The presence or location of a stream serving the site during aboriginal occupation, however, cannot yet be determined. It is inferred that the hydrologic processes in the vicinity are critical to the development and utilization of the site. The affect of these processes will be examined with the site morphogenesis and in discussions on the cultural stratigraphy.

LOCAL ENVIRONMENT

Physical Description

The Walnut site is roughly oval in plan (Figure 5.2). The long axis of the site runs roughly northwest to southeast along a line approximately 120° east of north. The dimensions of the site are about 100 m by 70 m. The site rises approximately 1.8 m above the surrounding floodplain (Figures 5.3 and 5.4) to an elevation of over 89.3 m A.M.S.L. The topography of the floodplain is undulating, with a considerable number of natural swells.

Sloughs and rises throughout the floodplain exhibit different drainage, soils, and vegetation.

Geologic processes, prehistoric cultural deposition, and historic activity all influenced the present shape of the site (Figures 5.3 and 5.4). The central half of the site is relatively flat. The northwestern flank of the site has the steepest slope; the southern and southeastern flanks have the most gentle slope.

The overall shape of the site suggests a fluvial bar feature with the normal direction of current flow oriented towards the southeast. The leading edge of the site (northwestern flank) is somewhat higher and steeper than the trailing edge (southeastern flank). The vast majority of the site matrix appears to have been fluvially deposited. Field observations suggest that the average size of the sand fraction within the site is larger in the northwest portion of the site, indicating a higher energy deposition.

The prehistoric deposition of cultural materials appears to have been accretional rather than massive. Intrasite patterning of occupation and deposition is not clear. The central (and higher) area of the site, however, appears to have been more heavily utilized, probably due to the decreased possibility of flooding. Cultural deposits tend to thicken towards the central part of the site. But across the broad expanse of the site, the heavier cultural utilization in the central area did not greatly add to the overall height.

Historic activity appears to have truncated the deposits in the central part of the site. The clearing, construction, and maintenance operations for the TVA transmission line that crosses the site have caused a considerable amount of erosion. It is impossible to determine the height of the site before the TVA activity. Based upon the slope of the northwest flank, ground elevation in uncleared areas, and pedestals around the transmission tower legs, up to 50 cm of earth has likely been eroded. During clearing and maintenance of the transmission line, trees were bulldozed, leaving ridges of earth and timber on the edges of the clearing. Any potholes dug into the cleared area were subsequently covered during the periodic maintenance clearings, making surface estimations of subsurface disturbance impossible. The site had also been disturbed by modern logging and agriculture. There are many potholes of varying sizes and ages scattered throughout the southern, wooded part of the site. The southwestern part had been heavily potted.

Historic Landuse

No artifacts have been recovered which indicate postcontact use of the site by aboriginal peoples. The historic use of the site prior to this century is unknown at this time. Before 1936, the Walnut site was owned by Elia Googe, according to his son, who is still a local resident. The younger Mr. Googe has stated that to the best of this knowledge the site was not under cultivation before 1936, but has always been in timber. He further stated that hogs were probably driven onto the site in times of high water and that a hog pen might have been constructed. A portion of pig-wire fencing overgrown by tree bark was found suggesting that some type of pen or fence had been constructed on the site at some time in the past. A boar tusk found in the upper centimeters of one of the excavation blocks, as well as pig bone identified in the faunal analysis, indicates the presence of hogs on the site in recent times.

A review of the Chancery Court Records of Itawamba County (Deed Records) revealed that in 1936 the land including the site was sold to the Gilmore-Puckett Lumber Company of Amory, Mississippi. Mr. Googe related that the site was probably logged in the late 1930s and again in the mid-1960s. In 1954 the Tennessee Valley Authority purchased the right-of-way across the site. In the mid-1950s the transmission line was constructed and tower erected on the north-eastern portion of the site (Figure 5.2). Clearing for the line and tower, and subsequent maintenance clearing, apparently involved the use of heavy machinery. The construction and maintenance of the transmission line is responsible for serious, though unmeasurable, erosion and deflation of the site. In 1966 the Gilmore-Puckett Lumber Company sold the property to the Weyerhauser Corporation and in 1977 the title passed to the Mississippi Game and Fish Commission.

The surface disturbances observed at the start of the excavations were caused by the transmission tower construction and maintenance and amateur digging. Along the edge of the tower clearing trees had been pushed over and dirt was piled 60 cm high. This was probably accomplished with a bulldozer. The many large bolts and pieces of steel plate found on the surface further suggested the use of heavy machinery on the site either for tower construction and maintenance, or logging, or some other activity.

Pothunting on the site had been extensive; the evidence of it could be seen in all parts of the site. The southwestern portion of the site was the most effected. Although never quantified, pothunting activities appeared to have disturbed over 20% of the site surface out of the cleared area. Most of the more recent potholes were less than one meter deep.

Plant and Animal Communities

Flora

The Walnut site is characterized by sandy loam sediments. This is a result of its formation as a parallel bar in the relatively high energy depositional environment of the Upper Tombigbee Valley. A general overview of the present environment in the project area is presented in Chapter 3. The elevated nature and relatively good drainage of the site, combined with historic logging, had induced the development of the modern, park-like second growth assemblage of oak-hickory-sweetgum co-dominants with a red maple-dogwood-sassafras understory (Figure 5.5). The central cleared powerline right-of-way supports a varied herbaceous cover.

Fauna

The faunal community in the Upper Tombigbee River floodplain has been modified by the increased turbidity of streams and the clearing of large areas of both the uplands and bottomlands for modern agricultural activity. The introduction of foreign plant and animal species, along with modern hunting patterns, has also produced changes.

The animals present in the area should be those normally found in the mixed mesic, oak-hickory, and floodplain regions of the Southern Temperate Deciduous Forest (Shelford 1963). The larger or more conspicuous mammals include white-tailed deer, grey squirrel, bear, cottontail rabbit, raccoon, and opossum (Shelford 1963; Turcotte 1974). Wild turkeys, migratory birds, and numerous fish and reptile species are also found.

Few faunal remains were recovered during excavations. The majority of bone fragments found have proven to be unidentifiable. The bone which could be identified came from animals which would normally be expected in the locale. The only exception was the presence of dog bones, suggesting that this animal was kept as a domesticate. The faunal remains are discussed in detail in the cultural remains section of this chapter.

EXCAVATION STRATEGY

The original analysis of the test excavation material (Bense 1979b) showed a mixed Woodland component and a "thick, rich, and informative" Late Archaic component. These conclusions were

based on two 2 m by 2 m hand excavation units (a third was quickly abandoned when it was found to be disturbed by an old pothole), and four backhoe trenches.

The material from the testing program was subjected to reanalysis at the initiation of this mitigation project. The conclusion in the reanalysis report (Bense 1982a:386) stated that there were intact, stratified Archaic deposits on the site, rather than merely a Middle Archaic component as was stated in the original testing report (Bense 1979b).

The research orientation and strategy at the start of the Walnut site excavations was based on the original analysis of the testing data. The excavation strategy evolved throughout the excavation of the site based on the pragmatic review of the accumulating data.

DURATION AND CONDITIONS OF FIELDWORK

Twenty-eight work weeks were spent excavating the Walnut site. Fieldwork began on March 10 and continued through September 19, 1980. All extremes of Mississippi weather were encountered during this period. The first months were marked by bitter cold, rain, and extremely difficult access to the site. The weather and access improved markedly during the summer months.

Construction of the waterway levee allowed access by vehicle to the site for the first time on May 7, 1981. Before that time the site was reached by walking or boating (Figure 5.6). At worst, it took approximately 3.5 hours to get the entire crew to the site and a comparable time to leave. On a number of occasions, equipment was taken to the site in boats that had to be dragged through the swamps by the crew. Ice, snow, and rain often hampered activities. Rushing water, submerged stumps, mud, and cold temperatures were hardships that sometimes made getting to the site a dangerous affair. Several thousand man-hours were spent in the difficult access conditions over the length of the excavation. Much of the early part of the excavation was made possible only through the perseverance and hard work of the crew.

Driving access to, or very near, the site during the summer increased productivity substantially. Safety hazards also decreased dramatically. Equipment and personnel could usually be transported directly to and from the site. At times the vehicles were parked about a kilometer away due to construction activities.

RESEARCH OBJECTIVES

The project research design posed a number of questions and hypotheses. The answers or elucidations of these are the objectives of the research project as a whole. The development of a well-defined culture history was one of the primary objectives of the Walnut site excavations. The investigation of specific components or periods, as well as special cultural phenomena, was a goal of the research. Throughout the excavations emphasis was placed on gathering subsistence data and elucidating the relationship of the inhabitants to the environment.

Of particular interest on the Walnut site was the integrity of the Archaic components and the suspected mixing of the ceramic horizon. Reported concentrations of fired clay, thought to be possible hearths (Bense 1979b:18), were considered of primary interest.

During excavations a number of phenomena were encountered which became foci of additional investigations. Study of the complex depositional history of the site and the morphogenesis of the sediments entailed considerable effort. Discovery of numerous deep burials with extremely poor preservation created an enigma with few substantive answers. A great number of features were excavated which yielded little or no temporal data. Also uncovered were large, apparently prepared areas which indicate numerous activities were conducted on the site during Middle-Late Archaic times. The strategies and methodologies employed in the excavation of the site, of necessity, evolved pragmatically to accommodate a maximum data recovery.

METHODS AND TECHNIQUES

Chemical and visual cores, test pits, backhoe trenches, and large excavation units were all employed in excavating the site. The use of the various methods was determined by specific goals, and in some cases influenced by other factors such as time and weather. The Field Procedures Manual (Appendix V) describes in detail the standard excavation techniques and procedures employed on the project.

The length of time spent on the Walnut site excavations and the expected volume of excavated dirt warranted special considerations for processing the fill. A water-screening station was constructed on the northern edge of the site. The nearby stream, and later a sump pit, provided water for the station.

The rainy conditions during much of the excavation made construction of shelters over some of the excavation units a practical

measure. Shelters constructed over the smaller (4 m by 4 m) units withstood the weather better than the large shelters. The cost of the shelters was more than offset by the savings in lost time and damage to the excavation units.

Coring Investigation

Both visual and chemical cores were taken systematically on the Walnut site. An intensive visual coring program sampled the entire site at 2 m intervals. Chemical cores were taken at 8 m intervals on the site, with two 4 m interval transects also being sampled for finer control.

The purpose of the 2 m interval visual core grid was to locate large visual anomalies, such as charcoal concentrations and fired clay areas, and to follow stratigraphic boundaries. The visual cores allowed placement of large excavation units directly over two large fired areas. Excavations, however, exposed two additional large (greater than 2 m diameter) fired areas. And the visual cores proved of little use for observing subtle stratigraphic changes.

The chemical cores were retrieved and tested for pH, phosphates and carbonates in hopes of discerning different loci of activity across the site. The results were not satisfying. An excavation unit was located over an apparent chemical anomaly, but no positive relationship with any cultural phenomena could be determined.

A total of 1468 cores were examined on the Walnut site. Of these, 121 were chemical cores. The chemical cores require substantially more field time than visual cores because they must be labeled and bagged as well as undergoing visual examination.

It has been determined that a two person coring crew can examine about 30 cores per day, each core averaging over 2 m in depth. On this basis, it is estimated that more than 100 man-days were spent coring the Walnut site.

This great expenditure of time and expense resulted in the location of the prepared clay areas. If ground water and access conditions had been more favorable, the calculated placement of several backhoe trenches would have eliminated the need for extensive coring by allowing detailed study of the site stratigraphy.

Excavation Blocks

Four large excavation blocks, A through D, were excavated at various times on the Walnut site (Figure 5.2). Blocks A and B were begun first followed by Block C. The placement of these three blocks was based upon the results of the coring and their representation of different areas of the site. Block D, in addition to these criteria, was placed adjacent to a test pit. Blocks A, B, and C were begun prior to the excavation of four test pits.

Block A

This 4 m by 4 m block was placed on the wooded southeastern slope of the site (Figure 5.2). Chemical coring indicated an area of low pH (acidic) and high levels of phosphate, a situation which might be indicative of a trash dumping area rather than an occupation area (Guy Muto, personal communication 1980). No visual core anomalies were noted in the immediate area chosen for the block.

Block B

A distinct fired clay deposit was observed in the visual cores approximately 60 cm below the surface. No chemical anomalies were apparent in the immediate area. Block B was therefore placed over the visual anomaly. The block was also intended to sample the south-central area of the site. The block was originally begun as a 4 m by 4 m unit but was later expanded to an 8 m by 6 m block in an attempt to identify activity loci around the fired area.

Block C

The largest and most well defined fired clay (or fired aggregate) anomaly, located via visual coring, was in the northern quadrant of the site within the area cleared for the transmission line (Figure 5.2). The fired aggregate observed in the cores was 5 cm to 8 cm thick. Abundant charcoal was also recovered in surrounding cores. Numerous visual anomalies were observed within 15 cm to 20 cm of the major anomaly, suggesting an area of extensive activity. In addition to investigating the visual anomalies, the placement of Block C in this area accommodated sampling the northern and highest areas of the site.

Block C was a 10 m by 10 m block which began as a 12 m by 12 m block, but time restraints dictated a smaller excavation. It was designed to investigate activity loci over a broad area.

Block D

This block was located in the center of the site (Figure 5.2) on the basis of a charcoal-rich visual core anomaly. A test pit was placed over the anomaly, which prompted the excavation of an adjacent 4 m by 4 m block. Block D was expanded to a 6 m by 8 m block when it became evident that the complex feature excavations in Block C would prevent that block from being excavated to the bottom of the site within the allotted time.

Extent of Block Excavations

To obtain representative samples of all levels of the site and to avoid overrepresentation of certain stratigraphic zones at the expense of others, certain blocks were not excavated completely from the surface to the bottom of the site. The number of 2 m by 2 m units excavated in each 10 cm level is indicated for each block in Table 5.1. It should be noted that the levels in each block are determined by their depth below the average ground surface of that block.

In Block D, where a greater number of units were excavated in the lower levels than in the upper levels, the remainder of the sediment from the upper levels was removed with a backhoe. The sediments below Level 13 of Block C were removed with a backhoe to look for pits extending into the lighter colored sediments that underlie the site.

Test Pits

During the first three months of excavations on the site, it became progressively apparent that additional areas of the site needed to be sampled. The large size of the site made it impossible to assume that the three major blocks under excavation (Blocks A, B, and C) were representative of all parts of the site. The watertable in the site was also beginning to drop, affording the opportunity to excavate to the bottom of the cultural deposits, a necessity that had been impossible up to that time. The earlier test excavations (Bense 1979b) were also prevented from reaching the bottom of the cultural deposits by high ground water. The lowest cultural deposits on the site had yet to be

sampled. To alleviate that situation, as well as provide a better understanding of the physical stratigraphy that aided in guiding the excavations of the major blocks, we decided to place four 1 m by 2 m test units on various untested areas of the site (Figure 5.2). One test pit (102S/87W) was placed on the northeastern slope of the site, another (146S/69W) was located on the extreme southeastern edge of the site, and a third (122S/146W) was placed on the western slope of the site. The fourth test pit (118S/103W) was placed in the central area of the site. It was this central test pit that led to the placement of Block D. To gather more data on the lower levels of the site at Block D, a 2 m by 2 m unit (130S/121W) begun during testing (Bense 1979b) was completed down to the base of the cultural materials.

Stratigraphic Trenches

Five trenches were dug with a backhoe to further investigate the stratigraphy of the site (Figure 5.2). These trenches, along with the excavated units, showed that the strata were generally continuous across the site. However, profile drawings of the stratigraphic trenches and excavation blocks indicated that stratigraphic discontinuities did exist, probably due to the varied fluvial and erosional actions of the Tombigbee floodplain. Stratigraphic Trench 5 was placed off the southeastern part of the site to investigate off-site sediments. This trench contained a thick deposit of blue clay indicating slack-water deposits.

STRATIGRAPHY

The soils or sedim nts on an archaeological site can provide data concerning climatic and biotic conditions, age, and cultural activities. A processural investigation of the site sediments necessitated some comparative analysis of off-site sediments.

SOILS AND SEDIMENTS

Setting

The site is in the eastern part of the Tombigbee River floodplain about 750 meters west of the eastern valley wall and is a prominent topographic feature elevated above the surrounding lower-lying floodplain. The site has slopes of 2% to 5%, in contrast to the 0% to 2% slopes in the adjacent floodplain. Lower parts

of the site are subject to flooding during winter and spring months. Scouring and filling by floodwaters have created some microrelief in the floodplain.

The mound appears to be a natural topographic feature resulting from fluvial deposition. Small sloughs partially surround the site and their silty sediments indicate an aggrading status. The coarse texture of the sandy loam soils in the mound suggests higher energy depositional events.

Soils

Upland Soils

The steep valley walls bounding the floodplain are composed of mature, well-developed soils with illuviated argillic horizons (Bt) and eluviated A2 horizons. Smithdale soils (Figure 5.4) dominate the eastern valley wall. These soils are deep, well drained, and permeable, with red subsoils. They formed in thick beds of loamy materials on sideslopes ranging to 40%. The argillic horizons have subangular blocky structure and oriented clay skins on ped faces. Soils of the western valley wall are less steep, and the Ora and Savannah soils contain dense, firm fragipan horizons below the argillic (Bt) horizons. The Mathison soils of the western valley wall have relatively high silt contents. The upland soils are very strongly acid, highly weathered, siliceous Ultisols (Table 5.2) with low base saturation levels.

Floodplain Soils

Kirkville and Mantachie soils compose the floodplain adjacent to the site (Figure 5.4). These soils are Dystrochrepts and Fluvaquents with minimal soil development (Table 5.2). They typically have brown and yellowish-brown surfaces and gray or light gray subsurfaces (Table 5.3). Texture varies and includes sandy loam, loam, clay loam, silty clay loam, and occasional loamy sand, which reflects the textural stratification (Table 5.4). The floodplain soils exhibit little profile development and have cambic B horizons (color B). They are strongly acid.

Site Soils

The culturally altered soils of the site developed in loamy, fluvial, siliceous sediments. These soils were readily distin-

guished by very thick, humus-rich, dark reddish brown epipedons (surfaces), which were due to prolonged cultural activity and habitation. The past occupation of the site has drastically altered normal pedogenic features of color, structure, consistency, horizonation, organic matter content, and certain chemical parameters. The soil composing the site differed greatly from adjacent soils of the region and was thus easily distinguished.

Profuse populations of earthworms, crawfish, rodents, and other diverse microfauna and microflora thrive in the organic-rich mound, which is elevated above the adjacent floodplain and seasonal wetness. Pedoturbation has tended to mix the upper meter of soil and affected normal pedogenic developments. Natural horizonation tended to be masked by intense dark-colored humic staining of the skeletal matrix.

Physical Description: The mound soil in the upper 1.8 meters is dark reddish brown and reddish brown in Munsell hues of 5YR (Table 5.5), which differs markedly from the adjacent floodplain soils which have hues of 10YR (Table 5.3). The site epipedon has a Munsell value that shifts one unit when the soil changes from wet to dry, in contrast to adjacent soils. The dark reddish brown epipedon has a distinct, "greasy" feel when rubbed between the fingers. Individual quartz grains have a continuous coating of humic stain. The thick, dark epipedon grades into brighter colored subsoil materials at depths of 1.8 meters and greater. The subsoil has dominant colors in the 10YR hue. Humic staining typically extends into the upper part of the brighter colored subsoil. Horizontal lamellae commonly occur in the subsoil, which has prismatic structure and polygonal seams similar to a paleosoil. The lamellae have brighter colors relative to the soil in the upper 1.8 m and slightly higher clay contents similar to micro-argillic horizons. The bands appeared to be related to eluviation of fines and illuviation at the water table. The polygons tended to form a continuous network, with the seams separating polygons filled with stripped silt and sand. Sand content increases and silt content decreases in the subsoil discontinuity (Table 5.6), and is accompanied by decreased fluctuating clay contents.

Particle size data (Table 5.6) indicate discrete fluvial depositions. The highest silt content occurred in the surface (0 cm to 15 cm) layer. The silt and sand particle size distributions reflect different energy depositional gradients. The constant sand fabric (Figure 5.7) also indicates, based on differences between the skeletal and labile soil components, textural discontinuities resulting from different depositional events.

The presence of structure, some degree of sand bridging, and patchy clay skins in the subsoil indicates pedogenic development more advanced than in the upper 1.8 meters. The soil morphologi-

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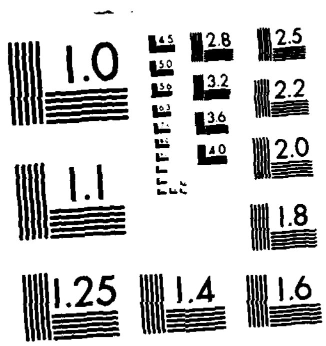

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

cal expressions may be relic features from previous soils that were subsequently buried by fluvial sediments, or they may have resulted from accelerated development. The pedogenic development in the subsoil contrasts sharply from the undifferentiated, gleyed, stratified subsoils of the adjacent floodplain (Table 5.3).

Chemical Description: Organic matter content is greatest in the 0 cm to 15 cm horizon, followed by a decrease to less than 1%, and then an abrupt increase to 1.38% at depths of 60 cm to 100 cm (Table 5.7). Very low organic matter levels were detected below depths of 180 cm.

Free iron oxides (Table 5.7) exceed 1% in the epipedon, with little decrease noted in the subsoil. The highest total P contents occur in the horizons with the highest clay contents. Surprisingly, organic P was only detected in the upper horizon. This placement is difficult to interpret because its occurrence is associated with human occupation (Griffith 1980).

Soil pH levels are uniform, ranging from 5.9 at the surface to a low of 5.2 at depths of 250 cm to 275 cm. The soil pH levels in the site are considerably higher than adjacent floodplain soils, which have average levels below 5.

Exchangeable aluminum levels are low in the upper meter and increase abruptly at depths of 250 cm to 275 cm (Table 5.8). Extractable acidity is considerably higher in the upper 1.5 meters, with highest levels occurring in horizons with the highest organic matter contents. Acidity exceeds 10 milliequivalents/100 g of soil at depths of 60 cm to 150 cm.

Pedogenic Inferences

The soils composing the site differed markedly in morphological, physical, and chemical characteristics from the adjacent floodplain soils. Pedoturbation and the dark reddish-brown stain permeating the epipedon tended to mask individual strata. The mound was better drained and deeper to a watertable than adjacent floodplain soils and exhibited greater pedogenic development. Textural discontinuities reflected different depositional events.

GEOMORPHOLOGY

The site is composed chiefly of fluvial sediments augmented by cultural deposition of material. The sediments found on the site

were almost exclusively sandy loam (Table 5.6), however, textural differences did occur.

The original topographical feature in the floodplain was most likely a bar deposit of the Tombigbee River or possibly a large tributary. The Tombigbee River is presently 1.6 km west of the site, but the original bar deposit probably developed when the river was much closer than at present. If the original bar was a point bar the river course ran adjacent to the site location. The size and shape of the site is probably related to the river's meander geometry (Nials 1980, personnel communication).

The sandy nature of the site sediments can be attributed to a number of influences (Nials 1980, personal communication). These include floodplain constriction in the vicinity of the site, a relatively steeper gradient, the meander geometry of the Tombigbee River, and the influx of coarse sediments from several nearby tributaries. The site sediments are generally coarser than those found downstream at the Poplar site (22IT576) but are substantially finer than at the Ilex site (22IT590) upstream along Mackeys Creek.

These coarser and thicker deposits on 22IT539 as compared to 22IT576 suggest a much more rapid deposition. This again supports the concept of a higher energy environment.

CORRELATION OF NATURAL AND CULTURAL STRATIGRAPHY

The pedogenic and geomorphological data indicate that 22IT539 is the result of the complex interaction between the changing Tombigbee floodplain and human behavior. The soils and sediments on the site are culturally modified to a great extent with humic staining extending into the upper portion of the "polygonal soil" (Zone VII). The following discussion characterizes the individual zones recognized at the site which relate to natural and cultural activity. These are based in large part on textural and color differences.

The following stratigraphic description appears to be representative of the whole site. Seven major zones were recognized at the Walnut site; this description is based on the South and East profiles of Block D (Figure 5.8 and 5.14).

Zone I. The humus zone averages 4 cm in thickness.

Zone II. The dark reddish brown (5YR 3/2) sandy loam averages around 40 cm in thickness.

Zone III. The dark reddish brown (5YR 3/2 and 5YR 3/4) loam, mottled with strong brown (7.5YR 5/8), averages 20 cm in thickness.

Zone IV. The very dark brown (10YR 2/2) sand loam with undulating dark brown (5YR 3/2) and dark brown (7.5YR 3/2) loam lamellae averages 40 cm in thickness.

Zone V. The very dark brown (10YR 2/2) sandy loam mottled with brown (10YR 4/3) and yellowish brown (10YR 5/8) containing common charcoal and fired aggregate inclusions, averages 6 cm in thickness.

Zone VI. The very dark brown (10YR 2/2) sandy loam which grades to light yellowish brown (10YR 6/4) and brown (10YR 5/3) with increased depth, averages 40 cm in thickness.

Zone VII. The dark yellow brown (10YR 4/4) sandy loam, with polygonal development, represents the bottom of excavations in Block D.

Zone I was primarily the result of recent alluvial processes and was found to contain few artifacts. Zone II contained an admixture of Terminal Late Archaic, Gulf Formational, Woodland, and Mississippian artifacts. Zone III produced initial Late Archaic Benton material at the Walnut site and contained a great amount of organic staining. Zone IV contained Benton and Late Middle Archaic Sykes-White Springs material. Zone V represented a narrow zone of concentrated fired clay and charcoal which was present in Block D and probably extended across the site in varying amounts. Features 120 and 115 in Block C appeared to correlate well stratigraphically with this zone. It probably conformed to Late Middle Archaic Sykes-White Springs occupations. Zone VI contained Early Middle Archaic Eva-Morrow Mountain, Crawford Creek, and Cypress Creek material and was organically stained with numerous fired aggregates and charcoal fragments. Zone VII represented the subsoil which was virtually devoid of artifacts in the lower portion.

Although these zones were generally uniform over the site, the ability to see the zones in profile was hampered by the dark humic stains which mask individual facies.
As pointed out earlier, discrete episodes of fluvial action are represented at the site, suggesting that sedimentation and erosion varied over the site. This hypothesis of variable site erosion when coupled with the view that differential site occupation has occurred through time suggests that it would not seem unusual to find both occurrences on this site.

In terms of cultural modification to the site soils and sediments, it appears that Zones III, V, and VI primarily resulted from human activity. This was probably augmented by local environmental conditions that served to preserve the midden. Conditions such as these could be related to shifts in climatic regimes which variously affected local depositional environments.

Research by Muto and Gunn (1981) suggests that there was a certain amount of climatic change in the Upper Tombigbee Valley during the Late Quaternary. They suggest, as have other researchers in the Southeast (Watts 1975; Delcourt 1978), that an environmental episode, known variously as the Altithermal Hypsithermal, or Post glacial Climatic Optimum, occurred between 6,000 and 2,000 B.C. This warm interval may have been characterized by either increased (mesic) or decreased (xeric) amounts of usable moisture. The beginning date of the Altithermal roughly corresponds to the formation of the Middle Archaic Eva-Morrow Mountain zone at the Walnut site. The formation of the Benton zone occurred toward the end of this period. It is currently not clear how this climatic episode influenced the site formation processes at the Walnut site. However, this was the most discrete, intensive cultural period.

Correlating the Walnut site stratigraphy with those from the other excavated sites will be helpful in attempting to address this and other such questions in the concluding chapter of this report.

CULTURAL REMAINS

FEATURE CLASSES

A number of anomalies relating either to cultural or natural processes were encountered at 22IT539 (n = 148). A total of 166 feature designations was given in the field; however, some were later voided and burials were often given two feature designations, one for the pit containing the burial and another for the remains themselves. Features include nonportable phenomena such as pits, hearths, prepared areas, and fired aggregates; however, several artifact clusters were also noted. The distinction between natural and cultural phenomena was often difficult to determine at the Walnut site, due to the color of the soil horizons and the inability to visually or texturally discriminate them. Many features at the site could not be defined using current field techniques. Other features, the result of cultural phenomena, were so poorly defined that function or any other aspect could not be determined. Many of the features were natural disturbances.

Some features, particularly the prepared areas, fired aggregates, pits, inhumations, lithic clusters, and hearths, were the result of intentional human behavior. Others, such as small, amorphous pits and soil stains, were questionable as to their cultural or natural origin. Summary attribute data for all feature categories are presented in Table 5.9. These include: feature type and subtype, feature number, block designation, level of definition where possible, level of origin where possible, length, width, depth or thickness, and cultural affiliation.

Cultural affiliation of features was difficult to determine at the Walnut site. The vagaries of pit definition and the paucity of diagnostic materials within definable contexts made a definite cultural assessment impossible for many features. Because of the semi-stratified nature of the site's sediments, tentative but general cultural affiliations may be made for some features which lack diagnostic artifactual material. If the law of superposition is of any value at this site, (the general artifact distributions suggest that it is) then we may relatively date cultural features if we can be sure of their proper level of origin. Even this was difficult for many of the reasons given above.

Therefore, cultural affiliations of features at the Walnut site were made based on directly associated historical markers such as ceramics, projectile point/knives and other tools, or stratigraphic position. The latter method, although less preferable, was utilized for most cultural assignments. Affiliations based on this type of evidence are necessarily more general, allowing margin for error in detecting levels of origin, intrusions, etc. These are usually made to the period or stage level such as Early Archaic, Middle Archaic, Late Archaic, or combinations therein. When more direct evidence such as C-14 dates are available, tighter discriminations are possible, and the identification and classification level increase. The absence of ceramics in significant quantities, especially below Level 6, where ceramics were very infrequent was considered a marker for Archaic occupation.

In making these assignments based on stratigraphic position, it should be realized that many of them are questionable and represent our best estimate of their chronological or cultural position. Cultural features with definite contextual uncertainties are noted with a question mark. All cultural assignments are by stratigraphic position unless otherwise noted. Artifactual material from all features, regardless of their contextual, cultural, or natural origin is presented in Appendix II.

Twelve feature types were noted in the Walnut site. Some were subsequently subdivided based upon morphological criteria. Each

feature category is discussed separately below, noting the horizontal and vertical distribution. In addition, certain categories are illustrated with photographs and line drawings.

Ceramic Cluster n = 2 (not illustrated)

Two small ceramic clusters were recovered from Block B in Level 2. One was culturally identified with a Miller II component (Middle Woodland), the other with a probable Mississippian occupation.

Chipped Stone Cluster n = 1

A single concentration of biface "quarry blades" was encountered in Level 8 within the confines of Feature 99 in Block C (Figure 5.41). Five quarry blades, manufactured from Ft. Payne chert, were positioned vertically, one upon another. A Residual Stemmed and a Benton projectile point/knife were associated with them.

A functional consideration of this feature suggests at least two possibilities. One is that the pit which contained the chipped stone cluster was roughly oval in plan and shallow basin shaped. Three bone fragments recovered from the pit fill were not identifiable. Thus we may suggest that the cluster was associated with an inhumation. The second possibility is that the pit was used as a cache. Ahler (Appendix III) suggests that the microscopic wear patterns on the surfaces of the bifaces are consistent with bag transport. In all likelihood the bifaces were in some type of container when placed within the pit.

Botanical Cluster n = 4 (not illustrated)

Four small clusters . charred botanical materials were found at the Walnut site. These consisted mainly of concentrations or "pockets" of charred wood and nut fragments, often in association with a "prepared area." This suggests that some may represent residuum from firing activities conducted on or around the "prepared areas."

Complex Cluster n = 2 (not illustrated)

Two features were classified as complex clusters. One of these was a concentration of ground and chipped stone found in Levels 6

and 7 of Block A. A grooved axe and a mortar were found together along with an unidentified projectile point/knife fragment and an unidentified chipped stone fragment.

Fired Aggregates $\underline{n}$ = 13 (See Figures 5.9 - 5.11)

Thirteen fired aggregates were recovered from 22IT539. Four were found in Block A, seven in Block C, and two in Block D. In addition, several strata within the large prepared area features in Block B (Feature 6) and Block C (Feature 120) contained a few fired aggregates interspersed with other strata. They are discussed under the topic of prepared areas below and illustrated with the prepared areas.

These areas generally consisted of dense to diffuse, circumscribed areas of fired silt loam fragments. The aggregates averaged 12 cm in thickness and had an average area of roughly 0.50 m^2 They may or may not have contained artifactual materials and were most often devoid of charcoal and ash.

The highly oxidized, burned orange color of these phenomena suggests intense firing, possibly associated with cooking activities. The origin of the fired material comprising these aggregates has been the focus of intensive analysis. This is discussed in full detail under the "prepared area" discussion. Their distribution and cultural affiliation are presented in Table 5.9. Most appear to be associated with either Middle (Eva-Morrow Mountain/Sykes-White Springs) or Late Archaic (Benton) occupations. A few may be attributable to Early Archaic or Gulf Formational components.

Physical and chemical analyses were conducted on fired aggregates to compare selected parameters with nonfired aggregates of the mound. The "fired aggregates" were readily distinguished by their brighter colors and firm, massive consistency. The fired aggregates also contained mottles that gave color variations to the material. When the material was removed, air-dried, and ground to pass a 2 mm sieve, it typically had the following color:

	Fired Material
Dry	Reddish-Yellow (7.5YR 7/8)
Moist	Yellowish-Red (5YR 5/6)
	Dusky Red (2.5YR 3/2), Reddish Brown (2.5YR 4/4)

	Adjacent Non-Fired Material
Dry	Reddish-Brown (5YR 5/3)
Moist	Reddish-Brown (5YR 4/3)
	Dark Reddish Brown (5YR 3/2)

The fired materials were firm, compact and required considerable pressure to break. They tended to break into platy-shaped fragments.

Physical Characteristics

The fired materials were finer textured than adjacent nonfired materials (Table 5.10). The fired materials had higher clay and silt contents, and lower sand contents than nonfired materials. They also had lower, very fine sand contents. The differences in the skeletal and labile soil fractions between the fired and nonfired soil suggest the fired materials may have originated offsite. The textural body was similar to soils of the valley wall.

Chemical Characteristics

The fired materials had lower pH levels and lower exchangeable calcium and magnesium contents than nonfired materials (Table 5.11). Much higher extractable acidity levels (H) occurred in the fired materials, and higher exchangeable aluminum contents were detected. Base saturation levels were much lower in the fired materials. The chemical parameters of the fired aggregates were similar to those of the subsoils of the upland soils of the valley wall. Differences in organic matter contents were also apparent between the fired aggregates and the nonfired material. As expected, organic matter had been essentially destroyed in the fired aggregates by burning. The wet chemical oxidation procedure used was appropriate because it recovers the more active organic matter components and the charcoal is essentially excluded.

Hearths $\underline{n}$ = 2 (not illustrated)

Two shallow basin shaped or irregular burned areas containing concentrations of charcoal and ash were encountered. One was located in Level 10 of Block C and the other in Level 17 of Block D.

Pits $\underline{n}$ = 91 (Figure 5.13)

A variety of anomalies were classified as "pits." These ranged from root molds to stump casts, to rodent burrows to cultural pit features. Many were either natural or indeterminate.

Pit features were found in all blocks and most test units. Their cultural affiliation, location, and other pertinent data are presented in Table 5.9.

Pits were subdivided according to arbitrary size and shape criteria. Eight pit subtypes were recognized on the basis of pit diameter and profile. The range of pit diameters was divided into four segments: less than 10 cm, 10 through 29 cm, 30 through 60 cm, and greater than 60 cm. Each size variation was further defined by profile as either basin/U-shaped or amorphous/irregular.

Most pits originated in Levels 5 through 9 of Blocks A, B, and D. In addition, Levels 16 through 18 in Blocks A and D contained several pit features.

One pit feature was deep, cylindrical, and contained various strata (Figure 5.13). It contained the largest amount of botanical data from a discrete context at the site. Other cultural pit features were generally not as well defined. Several small "yellow stains" or small basin-shaped pits were found in the lower levels of Blocks A and D. Pieces of yellow earth were ubiquitous in these, but no explanation may be offered as to their cultural or natural origin.

In general it may be stated that there was a lack of well-defined pit features recovered from the Walnut Site. Functional designations could not be given to most of these.

<u>Prepared Areas</u> $\underline{n} = 8$ (Figures 5.9 - 5.11)

Prepared areas were composed of two or more strata, at least one of which was fired earth or "fired aggregate", as defined above. They were a mosaic of fired areas and strata of various colors, predominately reddish brown and yellowish brown. The fired aggregates were often found in the central area of the prepared area features and were surrounded by strata of varying colors and textures. Charcoal rich strata were encountered, but were only occasionally adjacent to fired aggregates. A light scattering of charcoal was sometimes encountered directly above the fired aggregates, but in most cases they were devoid of charcoal. No concentrations of ash were found in these features. The cleanliness of these features, coupled with the charcoal rich strata in some, suggests that the fired aggregates were hearths which were purposefully cleaned of charcoal.

The plan of the prepared areas was amorphous in outline. They were asymmetrical, but somewhat oval in form. The profile was lens shaped with the center appearing somewhat mounded. The

boundaries and the strata within them were often gradational and sinuous. Boundaries of the fired aggregates tended to be abrupt.

The number of strata recognized within these features varied from 3 to 21. The number of fired aggregates contained within the prepared areas varied from 1 to 5. The average area of these surfaces was 8.5 m^2, and ranged from 1.5 m^2 to 32.5 m^2. If the largest prepared area (Feature 120) is excluded, the average area is 4.6 m^2. The average thickness of was 30 to 35 cm.

The term "prepared area" is used here to indicate that these features were intentionally constructed. The presence of large amounts of yellow, yellowish brown and orange earth suggest that layers of clay or silt loam were more or less evenly spread over the midden prior to other associated activity.

As discussed above, these strata, including the fired aggregates, were sampled to test soil used in conjunction with preparation. Three of these features were sampled along with several control samples from the general site matrix.

The fired aggregate data indicate that the features were intentionally made. The presence of yellow clay in these features may suggest that there are unfired portions of these prepared areas. Only those places near the fired aggregates or other buring activity areas had the characteristic bright orange color.

In summary, the prepared areas had two dominant characteristics: 1)the presence of fired aggregates, and 2)multi-colored strata. The thickness and size varied, but most appeared to be dome-shaped in cross section, perhaps indicating focal points of use over a relatively short period of time. Repeated episodes of burning may have taken place on the areas. However, it is not clear if these episodes occurred during a restricted portion of the year, such as seasonal occupation, or if the habitation was permanent.

Inhumation and Cremation

Seventeen inhumations and one cremation were recovered at the Walnut site. The majority were located in Blocks A and D and extended well into the yellow polygonal soil (Zone VII). The burial pits were over 2 m from the surface at their deepest point. Most, if not all of the pits, appeared to originate in Zone VI, the Middle Archaic (Eva-Morrow Mountain) occupation zone.

Two cemetery areas were found, one in each of the above mentioned blocks. In addition, the cremation was found in Level 16 of

Block D, while two inhumations were recovered in Block C and Stratigraphic Trench No. 2, respectively. Summary attributes, such as age, sex, position, orientation, type, and artifact associations, are noted in Table 5.12 where possible. Summary data for the burial pits, where discernable, are presented in Table 5.9.

The two cemetery areas mentioned above contained the majority of the inhumations. The cemetery area in Block A (Figure 5.15) contained six individuals while the other in Block D (Figure 5.16) probably contained eight individuals. One instance of a fully flexed inhumation (Burial 19) was evident in Block D, perhaps indicating a different cultural context. The remains were placed into elongated, narrow, "trough-shaped" pits which were generally oriented north-northwest and were defined by slight organic staining and textural differences. The most common mode of interment at the site was the primary extended position with a north to northwestern orientation.

Within the Block D cemetery, the primary single interment type appears to predomiate. In the Block A cemetery, the primary multiple type was more common. In one case two individuals had been laid directly on one another (Burials 1 and 2). In terms of cemetery alignment, it appears that the individuals were placed in rows with all individual pits oriented north-northwest in both blocks.

In Block A two inhumations were partially excavated because they extended into the profiles of that unit. In Block D the cemetery area appears well defined with no interments occurring around it suggesting a patterned disposal. One possible burial pit in Block D, which was not excavated, is indicated in Figure 5.16.

It could not be determined if the individuals recovered from Block C and stratigraphic Trench No. 2 were in a cemetery, nor could the ones in the stratigraphic trench be fully excavated.

Skeletal preservation was extremely poor; only certain teeth of a few individuals were in a good state of preservation. For this reason few individuals could be aged or sexed (see Gilbert, Appendix III).

Artifact associations occurred with only three or four individuals. The only definite associations were with Burial 9 (one Muller/Pitted Anvilstone, one Hammerstone, one Muller/Hammerstone), Burial 11 (one Sykes-White Springs projectile point/knife, two projectile point/knife fragments), and Burial 10, a cremation, (one Zoomorphic Stone Bead, one Tubular Stone Bead, one Discoidal Stone Bead). Burial 5 contained a concentration of small quartzite pebbles near the chest region, suggesting the presence of a rattle. Several other individuals

had artifacts which were recovered in the pit fills, but no associations were apparent.

Individuals from both cemetery areas are illustrated in Figure 5.17 and 5.18 showing the poor state of preservation and general morphology of the mortuary pattern. In addition, the cremation from Block D is shown in Figure 5.12. The associated beads are illustrated in Figure 5.55.

Historic Intrusions $\underline{n}$ = 6 (not illustrated)

A small number of anomalies were recorded which are considered modern. These range from surface indications of camp fires to possible tracks left by mechanical operations on the site. One definite pothole (Feature 27) and an indeterminate pit disturbance (Feature 34) accounted for the remaining recognized historic disturbance. It may be noteworthy that during excavation the only historic intrusions were found in Block C, an area which had been cleared for transmission tower construction. This was discussed previously under historic land use. A pothole was present in Unit 146S/104W of Block B prior to excavation.

Stains $\underline{n}$ = 1 (not illustrated)

A single amorphous and shallow anomaly was classified as a soil stain (Feature 14).

ARTIFACT CLASSES

Ceramics

A total of 5,320 sherds, in addition to a moderate number of sherdlets and pieces of fired clay, were recovered from the Walnut site. Most sherds were eroded and difficult to identify. The type most frequently found on the site was Eroded Sand Temper. Seven major groupings by temper were identified: shell, shell-grog, grog, bone, limestone, sand, and fiber. A few sherds contained combinations of grog and fiber. Bone inclusions occurred rarely in several major temper groupings other than bone.

The following discussion breaks the ceramic inventory into the major temper divisions. Under the individual temper headings, qualitative and quantitative data concerning the specific ceramic types will be given. Pertinent reference material is given in Chapter 4, unless otherwise noted. The number of specimens in

each artifact category below represents the total number recovered from 22IT539. The distribution information for ceramics and all other material is located in Supplement III (provenience), Supplement II (cultural material in each provenience), Appendix I (summary of material by block and level), and Appendix II (cultural material in each feature).

Shell Tempered (Table 5.13, Figures 5.19 and 5.22)

A total of 461 shell tempered sherds were recovered. These are primarily of Mississippi Plain (n = 337) and Eroded Shell (n = 97). Other categories include Bell Plain (n = 8) and Decorated Shell (n = 19). The former category contains plain shell tempered sherds with fine shell inclusions, while the latter is composed mainly of Moundville Incised var. Moundville (n = 13). Other types represented include Residual Incised and Residual Cord Marked.

Shell-Grog Tempered (Table 5.14, Figures 5.19 and 5.22)

A total of 137 shell-grog tempered sherds was found. Only 10 specimens are diagnostic in terms of rim form, appendages, or overall shape. A few examples of shell-grog incised and cord marked (n = 19) were found ; however, most are plain body sherds. A single smoothed-over fabric-impressed sherd was recovered.

Grog Tempered (Table 5.15, Figures 5.19 and 5.20)

A total of 1,279 grog tempered sherds was recovered. This was second only to sand as the major tempering agent used in vessel manufacture. Baytown Plain is the most numerous category with 488 sherds recovered.

Mulberry Creek Cord Marked (n = 431) is almost numerically equal to Baytown Plain. Most (n = 405) of these are not diagnostic. The remaining grog tempered sherds belong to five categories: Alligator Incised (n = 1), Cormorant Cord Impressed (n = 15), Withers Fabric Marked (n = 2), Eroded Grog (n = 366), and Other Grog (n = 2). Alligator Incised and Cormorant Cord Impressed possess very fine grog tempering with a great deal of sand. Of the two sherds classified as Grog-Other, one is probably a coil fragment and the other is a kiln wad.

Bone Tempered (Figure 5.21)

A total of 75 bone tempered sherds was recovered. Three categories were recognized: Turkey Paw Plain (n = 46), Turkey Paw Cord Marked (n = 16), and Eroded Bone (n = 13).

Limestone Tempered (Table 5.15, Figure 5.21)

A total of 367 limestone tempered sherds was found in 22IT539. The ceramic categories represented include: Mulberry Creek Plain (n = 172), Flint River Cord Marked (n = 71), Long Branch Fabric Marked (n = 3), Eroded Limestone (n = 18), and Limestone-Other (n = 3). The three Limestone-Other sherds may be Flint River Brushed.

Sand Tempered (Table 5.15, Figure 5.20)

A total of 2,269 sand tempered sherds is present in the sample. This is the most abundant temper grouping on the site. The general temper grouping may be broken down into two major ceramic series; the Middle Woodland Miller Series (Jennings 1944), and the Late Gulf Formational Alexander Series (Heimlich 1952; Jenkins 1981). In addition, due to the numerous Eroded Sand Tempered sherds recovered, a large proportion of the sand tempered grouping could not be assigned to either of the above series. They are discussed separately after the presentation of the two series.

Miller Series: A total of 415 sherds from the site could be definitely assigned to the Miller Series from the site. Of that total, 180 are Furrs Cord Marked (Figure 5.20) and 235 are Saltillo Fabric Marked (Figure 5.20).

Alexander Series: A total of 51 sherds could be definitely assigned to the Alexander Series. They include (Figure 5.20) Alexander Incised (n = 29), Alexander Pinched (n = 14), Alexander Incised/Pinched (n = 1), Columbus Punctate (n = 7), and O'Neal Plain (n = 1).

Miscellaneous Sand Tempered: Besides the Miller and Alexander Series, some 1,803 sand tempered sherds were recovered. These are Eroded Sand (n = 1,558), Residual Sand (n = 242), and Sand-Other (n = 2).

These cannot be definitely assigned to either series because the temper of these sherds cross-cuts them (at least macromorphologically). However, most identifiable sand tempered

sherds were in the Miller Series. The two Sand-Other sherds are: Alexander Incised/Punctated, a sherd with either cord- or fabric-marking, and one sherd of Columbus Punctate which was erroneously classified in the original analysis.

Fiber Tempered (Table 5.15, Figure 5.21)

A total of 706 fiber tempered sherds was recovered. These are Wheeler Plain (n = 185), Wheeler Dentate Stamped (n = 17), Wheeler Punctate (n = 59), Wheeler Simple Stamped (n = 3), Eroded Fiber (n = 439), and Fiber-Other (n = 3).

The three sherds of Fiber-Other are all Wheeler Punctate, inaccurately classified in the original analysis.

Sherdlets (not illustrated)

Ceramic pieces that passed through the 0.5 inch mesh hardware cloth were recovered. They represent all major temper groupings. Most are eroded.

Fired Clay (not illustrated)

A large amount of fired clay was recovered. These are amorphous pieces of orange-grey-black burned clay silt or silt loam.

Chipped Stone

A total of 7,869 pieces of chipped stone was recovered from the Walnut site. The majority (n = 4,405) consisted of unidentifiable unifacial and bifacial fragments. These were unidentifiable at the macromorphological level as pointed out by Ahler (Appendix III), and most of these may represent fragments of projectile point/knives, preforms, or biface blades. Another major grouping of chipped stone artifacts was projectile point/knife fragments (n = 1550). Together, these categories account for over 75 percent of the chipped stone implements.

The remaining 25 percent encompass primarily the following categories: identifiable projectile point/knives, biface blades, preforms, cores, scrapers, drills, reamers, perforators, gravers, choppers, adzes, knives, microliths, wedges, chisels, spokeshaves, denticulates, digging implements, pieces esquille,

and a few combination tools. These represent a plethora of unifacial and bifacial implements which suggest multiple maintenance and extractive tasks performed at the site.

The chipped stone tools recovered from the Walnut site are described below. The projectile point/knives and other tools are discussed giving the following information: number of specimens, material composition, metric data, and general discussion. Metric data include the number of measureable specimens, the number of measured cases recorded for each attribute on which the summary statistical data is based, and the range, mean, variance, and standard deviation of the metric values for each attribute measured for each tool category. The measurement data is given in table form for all categories. Additional measurement data are located in Supplement IV of this report. It should be reiterated that in all categories which were measured, only measureable specimens appear in the summary tables or lists. The actual number of specimens in each category is presented in the description as "n = __". Specimens were not measured unless at least one variable was obtainable (see Chapter 4 and Appendix IV). The following chipped stone tools were not measured: unidentifiable projectile point/knife fragments, biface blade fragments, core fragments, scraper fragments, drill fragments, and unidentifiable chipped stone fragments. The order of presentation for these categories will follow the laboratory analysis artifact lists in Appendix IV. Vertical and horizontal distribution of this material may be found in Appendices I and II. In these tables the chipped stone is presented under the major subheadings of Cores, Preforms, Biface Blades, and Miscellaneous Stone Implements. Illustrative material is provided for most categories in the form of photographs (in this section), and line drawings (Chapter 4). All reference material is given in Chapter 4 unless otherwise noted.

Projectile Point/Knives

A total of 2,176 identifiable or fragmented projectile point/knives was recovered. The specimens were assignable to 28 types (n = 626). These are discussed below. Measurement data are presented in Table 5.16.

Benton Short Stemmed n = 163 (Figures 5.22 - 5.24):

Material:

Ft. Payne	128	Fossiliferous Bangor	2
Heated Camden	26	Tallahatta Quartzite	2
Unheated Camden	2	Unidentified	1

Discussion: This was the most prevalent projectile point/knife category recovered from the site. One of the distinctive features of this category is blade length variability. Examples from the Walnut site varied as depicted by the high standard deviation of overall length. The technique of manufacture appears to be related to an undefined core and blade industry which involves the use of Ft. Payne chert. Primary flake/blade blanks were bifacially retouched using a soft hammer percussion technique to thin the flake or blade; this resulted in a triangular biface. The proximal portion of the biface was then further modified to produce a haft element.

Blade length variation appears to be related to maintenance and rejuvenation (See Ahler, Appendix III). Most Bentons from the Walnut site are characterized by steeply beveled basal and blade edges. The degree of steepness or beveling varies, a few points exhibit little or no beveling. The mode of retouch associated with blade and haft element beveling is most likely pressure flaking. These scars are most often small and contiguous, averaging 3 to 4 mm wide and less than 5 mm long. Many of the primary flake scars are obscured by secondary blade modification, including rejuvenation.

Breakage patterns consist of transverse fractures generally in the medial to proximal portion of the points. Distal fractures that suggest impact are rare (See Ahler, Appendix III). Although a few Bentons were made from Heated Camden chert, an objective means for determining whether or not Bentons are made of heated Ft. Payne chert is not currently available (See Bond 1980). Most Bentons were recovered at the Walnut site from Levels 5 through 9 in Blocks A, B, and C.

<u>Benton Extended Stem</u> <u>n</u> = 52 (Figure 5.25):

Material:

Ft. Payne	39	Fossiliferous Ft. Payne	1
Heated Camden	8	Tallahatta Quartzite	2
Unheated Camden	2		

Discussion: This "variety" of Benton was sorted on the criterion of a longer haft element than the short stemmed category. The method of manufacture, rejuvenation, and use appears to be the same as Benton Short Stem. Meaningful historical subdivisions of Benton points are not readily apparent from this analysis.

<u>Benton Barbed</u> <u>n</u> = 14 (Figure 5.26):

Material:

Ft. Payne	13	Heated Camden	1

Discussion: This Benton "variety" differs from the Benton Short Stem by the presence of barbed shoulders. The length of the haft element was not considered. The method of manufacture, rejuvenation, and use is similar to the other Benton "varieties."

No basis, other than a formal one, was considered in the discrimination of this "variety." Historical, technological, or functional differences were not discerned.

Big Sandy $\underline{n}$ = 8 (Figure 5.27):

Material:

Heated Camden	6	Unheated Camden	1
Ft. Payne	1		

Discussion: These forms are distinctively side-notched with ground bases and notches. The notches are formed by what appear to be alternating percussion blows directed perpendicular to the plane defining the lateral haft element edges. The basal edge and notches appear to be retouched via a pressure technique. These retouch flake scars are generally 2 to 5 mm wide and up to 5 mm long. Blade edges are finely retouched, apparently by pressure flaking. One specimen is deeply beveled and rhomboid in cross section; the others are plano-convex in cross section, perhaps indicating they were made on a flake. Breakage patterns show a tendency to fracture toward the distal portion of the point and may relate to its function (See Ahler, Appendix III).

Bradley Spike $\underline{n}$ = 2 (Figure 5.27):

Material:

Ft. Payne 2

Discussion: This spike form is thick in cross section and somewhat median-ridged. The haft element modification is slight, resulting in a weak shouldered, narrow lanceolate appearance. Primary flaking was most likely by hard hammer percussion. Secondary flaking is present on blade margins. Flake size is generally small; less than 5 mm long and from 2 to 4 mm wide. Neither specimen is fractured. These specimens appear to be related to the Mud Creek forms.

Crawford Creek $\underline{n}$ = 8 (Figure 5.27):

Material:

Heated Camden	6	Fossiliferous Ft. Payne	1
Ft. Payne	1		

Discussion: Crawford Creek points have slight corner notches, short, wide haft elements, and flattened cross sections. Method

of manufacture is by light percussion and pressure retouch. Bases are not ground.

Cypress Creek $\underline{n}$ = 11 (Figure 5.28):

Material:

Heated Camden	6	Ft. Payne	1
Unheated Camden	3	Unidentified	1

Discussion: These corner-notched points resemble Kirk forms in overall morphology, but are larger with wider notches. The bases are not ground and there is only a slight hint of beveling.

The points appear to be made on flakes by a combination of light percussion and pressure retouch. Retouch or resharpening on these forms is minimal, however, pressure flake scars occur on blade and base margins.

Most specimens are broken toward the proximal end of the point; evidence of impact is minimal. The evidence presented by Ahler (Appendix III) regarding Kirk resharpening practices will be discussed in a summary section. This could be related to some of the different-sized Kirk and Cypress Creek forms recovered.

Dalton $\underline{n}$ = 2 (Figure 5.28):

Material:

Ft. Payne	1	Fossiliferous Ft. Payne	1

Discussion: Two forms of Dalton are represented in the sample; one resembles the Colbert "variety" of northern Alabama (Figure 5.28) and the other the Greenbrier variety (Figure 5.28). Both were probably made on flakes. Secondary resharpening has occurred, creating slightly serrated blade edges. The Colbert "variety" has heavily ground basal and haft element edges while the other has a slightly ground base. Flake scars resulting from retouch are generally less than 5 mm long and from 2 to 4 mm wide.

Elora $\underline{n}$ = 2 (Figure 5.28):

Material:

Heated Camden 2

Discussion: This stemmed form has broad, horizontal shoulders. The method of manufacture appears to be by both percussion and pressure flaking. Flake scars are generally broad and shallow and retouch is minimal. One point has been fractured in the medial section.

Eva n = 4 (Figure 5.29):

Material:

Heated Camden 3	Unheated Camden 1

Discussion: The haft element of this form is modified on a plane tangent to the base, giving a basal notched effect. These specimens appear to have been made on flakes with soft hammer percussion evidently used in primary flaking. Secondary retouch occurs primarily along blade margins resulting in a sinuous biface edge, probably produced by pressure flaking. The scars are from 2 to 5 mm wide and less than 5 mm long. This form is similar to the Morrow Mountain I form.

Flint Creek n = 9 (Figure 5.29):

Material:
Heated Camden 9

Discussion: It appears that these points were made on flake blanks by a light percussion and pressure technique. Most points have heavily serrated blade edges, indicating that retouch in the form of resharpening probably took place. The base is relatively unretouched. Pressure flake scars are very diminutive and are generally from 2 to 3 mm wide and less than 7 mm long. Breakage patterns suggest that some of these points may have been used as projectiles. Three have fractured tips with one exhibiting an impact fracture. These forms resemble the Little Bear Creek forms but are shorter and proportionally wider.

Gary n = 3 (Figure 5.29):

Material:
Heated Camden 3

Discussion: Due to the limited number of specimens recovered, it is difficult to infer the method of manufacture, however, primary flaking was probably accomplished by both hard and soft hammer. Flake scars tend to be massive.

Secondary retouch is present but minimal. These forms closely resemble the Little Bear Creek forms with the primary difference being the contracting haft element of the Gary and the parallel to expanding haft element of the Little Bear Creek.

Kirk Corner Notched n = 14 (Figure 5.30):

Material:

Heated Camden 11	Ft. Payne 2
Unheated Camden 1	

Discussion: The Kirk forms are medium to large in size with variable blade lengths. This variability is probably due to resharpening activities (See Ahler, Appendix III). Some forms are deeply corner-notched while others tend toward shallower notching.

Most points appear to be made on flakes by a combination of light percussion and pressure flaking. Blade edges are alternately beveled on several examples and/or serrated on several others. Resharpening or retouch is evidenced on blade and basal edges. These flakes are small, from 2 to 4 mm wide and less than 5 mm long. The bases on all examples are ground.

Breakage patterns exhibited by the Kirk specimens are not suggestive of impact; rather they are usually transversely fractured toward the proximal end of the point.

Late Woodland-Mississippian Triangular n = 70 (Figure 5.31):

Material:

Heated Camden	61	Pickwick	1
Unheated Camden	4	Unidentified	1
Heated Tuscaloosa	3		

Discussion: The small triangular forms from the Walnut site have primarily incurvate basal edges and straight bade edges.

These points appear to have been made on flakes or heat spalls and evidently were manufactured by a pressure and/or percussion mode of retouch. Flake scars are diminutive, generally from 4 to 5 mm long and from 2 to 3 mm wide. They are contiguous around the blade and base margins. Some points have virtually one entire surface free of retouch, with only the distal end pressure flaked to produce a sharp projection. Flaking variability is great as some points flaked over both surfaces while other are minimally flaked. Impact fractures are common on this form.

Ledbetter-Pickwick n = 7 (Figure 5.32):

Material:

Heated Camden	1	Agate	1
Ft. Payne	3	Pickwick	1
Fossiliferous Ft. Payne	1		

Discussion: These large stemmed points are similar to the Little Bear Creek points, but they are somewhat larger with wider blades. It was difficult to infer the method of manufacture for these points given the sample size. It appears that percussion flaking was the primary mode of flake detachment. Flake scars are massive. Secondary retouch was minimal.

Three examples are fractured transversely in the medial section which is not suggestive of use as projectiles.

Little Bear Creek $\underline{n}$ = 33 (Figure 5.32):

Material:

Heated Camden	23	Fossiliferous Ft. Payne	1
Unheated Camden	1	Heated Tuscaloosa	1
Ft. Payne	6	Unheated Tuscaloosa	1

Discussion: These forms have a long, narrow haft element. It is likely that the points were made for the most part on flakes; however, some may have been manufactured from cobbles. Primary flaking was probably by both hard and soft hammer percussion as well as pressure retouch. Secondary retouch occurs primarily along blade margins with the haft element relatively unretouched. Flake scars along the margins average from 2 to 4 mm wide and less than 5 mm long. Several points have bases formed by transverse fracture. Breakage patterns indicate that transverse fracture of the medial and proximal portions of the point was common. Several were fractured near the tip.

McCorkle Stemmed $\underline{n}$ = 1 (Figure 5.32):

Material:
Ft. Payne 1

Discussion: One example of a bifurcate base point was recovered. It possesses a deeply notched basal edge and shallow side notches. Flaking was by light percussion with some secondary retouch.

McIntire $\underline{n}$ = 1 (Figure 5.32):

Material:
Heated Camden 1

Discussion: A single example of a McIntire point was recovered. It possesses incurvate tapered shoulders and an expanding haft element that gives a side-notched appearance. Flaking was by percussion with little retouch.

Morrow Mountain $\underline{n}$ = 9 (Figure 5.33):

Material:
Heated Camden 9

Discussion: Three "varieties" of Morrow Mountain were recovered from the Walnut site; Morrow Mountain, Morrow Mountain Straight Stemmed, and Morrow Mountain Rounded Base. Most were either Morrow Mountain Stemmed or Morrow Mountain. The major distinc-

tion between these two "varieties" is the presence of a stem with well defined lateral and basal edges on one and the lack of such a well defined stem on the other.

The Morrow Mountain points are rounded base, corner-removed forms. The haft modification is on a plane tangent to the lateral margin of the point rather than the base.

These points appear to have been made on flakes by a combination of light percussion and pressure flaking. Secondary retouch is present primarily along blade margins, with flake scars generally from 2 to 4 mm wide and less than 5 mm long. The bases may be lightly ground. This form resembles the Eva form above but does not exhibit basal notching.

Morrow Mountain Straight Stemmed $\underline{n} = 14$ (Figure 5.33):

Material:

Heated Camden	12	Ft. Payne	1
Unheated Camden	1		

Discussion: These forms possess the characteristics of the Morrow Mountain and in addition have a well defined haft element. The only breakages noted on these forms were two "impact" fractures.

Morrow Mountain Rounded Base $\underline{n} = 4$ (Figure 5.33):

Material:

Heated Camden	2	Fossiliferous Ft. Payne	1
Ft. Payne	1		

Discussion: These forms possess a simple excurvate base and straight blade edges, similar to the category Broad Base Triangular biface blade. They were manufactured similarly to the other variants, although one example is unretouched.

These bifaces were probably hafted; one possesses an impact fracture. This form could be an intermediate stage in the production of a "stemmed" Morrow Mountain point.

Mud Creek $\underline{n} = 3$ (Figure 5.33):

Material:

Heated Camden	2	Ft. Payne	1

Discussion: A few shallow side-notched forms were recovered which possessed expanding haft elements. Flaking was generally by percussion with little or no retouch.

Residual Side-Notched n = 1 (not illustrated):

Material:

Ft. Payne	1

Discussion: A single example of a side-notched point was recovered that did not conform to any established categories. It had been flaked by both percussion and pressure retouch.

Residual Stemmed n = 79 (Figure 5.34):

Material:

Heated Camden	55	Blue-Green Bangor	1
Unheated Camden	1	Fossiliferous Ft. Payne	1
Ft. Payne	17	Tallahatta Quartzite	1

Discussion: These forms could not be related confidently to an established type. A variety of techniques of manufacture were used, resulting in many varied forms. Most of these are probably variants of Benton, Sykes-White Springs, or Late Archaic stemmed forms such as Little Bear Creek and Ledbetter-Pickwick.

Residual Triangular n = 10 (Figure 5.35):

Material:

Heated Camden	5	Fossiliferous Bangor	1
Unheated Camden	1	Ft. Payne	3

Discussion: It is likely that most of these examples were made on flakes by a combination of percussion and pressure flaking. Secondary retouch is common along the blade and basal margins. Secondary flake scars are generally from 2 to 4 mm wide and less than 5 mm long. Only two specimens were not intact. One of these is fractured medially and one has a slightly fractured tip. The latter has multiple flutes on a single proximal face for a distance of approximately 2 cm (Figure 5.35 a). Individual flutes vary from 5 to 8 mm wide. The base is only slightly ground.

Some of these forms resemble those in the categories Broad Base Triangular biface blade and Morrow Mountain Rounded Base. Others appear unrelated to these forms but were apparently finished implements. The fluted example resembles other lanceolate fluted points from the Eastern Woodlands.

Savannah River n = 1 (not illustrated):

Material:

Unheated Tuscaloosa	1

Discussion: A single example of a large straight-stemmed point was recovered. It was flaked by percussion with little secondary retouch.

<u>Sykes-White Springs</u> <u>n</u> = 84 (Figure 5.36):

Material:

Heated Camden	48	Novaculite	1
Unheated Camden	6	Heated Tuscaloosa	2
Ft. Payne	24	Quartz	1
Tallahatta Quartzite	1	Unidentified	1

Discussion: These forms appear to be related somewhat to Benton points, but with shorter overall lengths and shorter haft elements. The length-width ratio of the haft elements for Sykes-White Springs is much lower than Benton. The haft element gives a shallow side-notched appearance.

Most points appear to have been made on flakes or blades. Primary flaking was most likely accomplished by a soft hammer technique. The scars for the most part are broad and shallow. These forms are not as heavily beveled as the Benton forms. Some beveling does occur, however, primarily on basal edges. The retouch flaking is present on both blade and haft element margins, evidently accomplished through pressure retouch. Retouch flake scars are generally from 3 to 4 mm wide and less than 5 mm long. Retouch is contiguous.

Blade length variation occurs, but the range is less than with Benton points. Breakage patterns for this group of specimens appear to be in the form of medial to proximal transverse fractures. Few distal fractures suggestive of impact were noted in the sample.

<u>Unfinished Small Triangular</u> <u>n</u> = 13 (Figure 5.35):

Material:

Heated Camden	9	Unheated Tuscaloosa	1
Unheated Camden	2	Ft. Payne	1

Discussion: These are small, thick, triangular bifaces with irregular flake scar removals. Most appear to have been thinned from flakes.

<u>Vaughn</u> <u>n</u> = 4 (Figure 5.35):

Material:

Tallahatta Quartzite	1	Unidentified	1
Quartzite	2		

Discussion: These broad haft forms are similar to the Sykes-White Springs forms. They have a shallow side-notched or corner-removed appearance. The technique of manufacture appears to be by percussion, with minimal secondary retouch. Although the sample size is small, it appears that the points were made on flakes. Fracture patterns are inconclusive. One example has a fractured tip, while the other has a transversely fractured basal edge.

Biface Blades

The measurement data for Biface Blades are given in Table 5.17.

<u>Ovoid Biface Blade</u> <u>n</u> = 7 (Figure 5.37):

Material:

Heated Camden	4	Ft. Payne	1
Unheated Camdnen	1	Pickwick	1

Discussion: The seven ovoid bifaces are well thinned and flaked over both surfaces. Two are made on flakes or blades and five are so reduced that the original blank cannot be ascertained. Primary flake scars are broad and shallow with secondary retouch absent; all but one have been fractured.

<u>Triangular Biface Blade</u> <u>n</u> = 45 (Figures 5.37 and 5.38):

Material:

Heated Camden	31	Tallahatta Quartzite	3
Unheated Camden	1	Fossiliferous Ft. Payne	1
Ft. Payne	9		

Discussion: The 45 triangular biface blades are mostly well-thinned and completely flaked over both surfaces. Eight are made on flakes while the nature of the original blank on 37 others was not clear. Primary scars were broad and shallow with a minimum of secondary retouch. Several examples (as noted by Ahler, Appendix III) have been extensively retouched and used. These obviously represent finished artifacts rather than a stage in the reduction process. A variety of fractures occurs on these specimens, primarily transverse fractures and lateral snaps.

<u>Narrow Triangular Biface Blade</u> <u>n</u> = 2 (Figure 5.38):

Material:

Heated Camden	2

Discussion: These blades are thinned, well flaked over all surfaces, and proportionally much longer than wide. One is made

on a flake, while the nature of the original blank is not determinable on the other.

Expanding Triangular Biface Blade $\underline{n} = 4$ (Figure 5.38):

Material:

Ft. Payne	4

Discussion: Two of these biface blades were made on flake-blade blanks. All are transversely fractured in the medial-distal section. Flaking is well executed, with thin, broad flake scars covering both faces resulting in a very thin, flattened cross section.

Broad Base Triangular Biface Blade $\underline{n} = 14$ (Figure 5.38):

Material:

Heated Camden	10	Fossiliferous Bangor	1
Pickwick	1	Unidentified	1
Ft. Payne	1		

Discussion: These blades are well thinned and flaked over both surfaces. The broad bases are straight to slightly excurvate and proportionally wide compared to their length. Most examples have been extensively retouched, suggesting that they were finished artifacts. A few are unretouched, suggesting an intermediate stage in the production of a point or other tool. These closely resemble the Morrow Mountain Rounded Base projectile point/knife and may be closely related. One appears to be made on a flake, the others were indeterminate.

Biface Blade Fragment $\underline{n} = 113$ (not illustrated):

Material:

Heated Camden	61	Heated Tuscaloosa	1
Unheated Camden	10	Tallahatta Quartzite	1
Ft. Payne	39	Pickwick	1

Discussion: Numerous fragments of bifaces blades were recovered and consisted of the following: distal fragments ($\underline{n} = 2$), medial fragments ($\underline{n} = 41$), and proximal fragments ($\underline{n} = 51$).

Biface-Other $\underline{n} = 3$ (Figure 5.39):

Material:

Heated Camden	2	Ft. Payne	1

Discussion: A few examples of thinned bifaces could not be assigned to a biface blade or fragment category. These had been fractured and may represent fragmentary pieces of broken biface blades.

Rehafted Biface Fragment $\underline{n}$ = 14 (Figure 5.39):

Material:

Ft. Payne	9	Unheated Camden	1
Heated Camden	4		

Discussion: The Rehafted Biface Fragments appear to be reworked projectile point/knives. These specimens could have been used in a number of ways. Hafting is inferred due to lateral notching.

Preforms

The measurement data for Preforms are presented in Table 5.18.

Preform I $\underline{n}$ = 86 (Figure 5.39):

Material:

Heated Camden	56	Ft. Payne	1
Unheated Camden	27	Pickwick	2

Discussion: Of the large sample recovered of this category, thirteen are made on cobbles, 23 on flakes, and 47 are indeterminate. Most were of heated Camden chert. These specimens are ovoid, triangular to amorphous shaped, and exhibit large, massive, conchoidal flake scars which are not contiguous. This results in unflaked surfaces including natural cortex. No secondary retouch occurs, although a few examples have small flakes removed from edges as a by-product of use. Most of these specimens represent a production stage of a thinned biface; however, several appear to have been used as tools.

Preform II $\underline{n}$ = 104 (Figure 5.40):

Material:

Heated Camden	85	Pickwick	2
Unheated Camden	13	Unheated Tuscaloosa	1
Ft. Payne	3		

Discussion: Of the large sample of Preform II forms recovered, one was made on a cobble, 28 on a flake, and 71 were indeterminate. The majority of these had been heat treated. These forms are thinned to a point intermediate between Preform I's and Biface Blades. They have been flaked over most of both surfaces, but unflaked areas remain. Little or no secondary retouch occurs. Almost all have been broken or fractured in some manner; undoubtedly some breakage occurred during manufacture. Flake scars vary from deep, massive hinge fractures to thin, shallow, feathered terminations. Several examples appear to be finished tools as they show macroscopic evidence of use. The

majority, however, represent an intermediate position in a biface manufacturing trajectory.

Quarry Blade $\underline{n}$ = 7 (Figure 5.41):

Material:
Ft. Payne   7

Discussion: These blades are well flaked, thinned, and show no evidence of use (Ahler, Appendix III). They are triangular to expanding triangular in shape, and some retain remnants of the striking platform. They exhibit a particular twist in cross section that was evidently produced in detaching the original blank from the core. Flake scars are broad and shallow and the lateral edges are lightly ground, consistent with an interpretation of a soft hammer reduction technique. Ahler (Appendix III) indicates that non-use wear, present on faces of the blades, is consistent with bag transport. They are probably preforms for Benton points.

Cores

The measurement data for Cores are presented in Table 5.19.

90° Core $\underline{n}$ = 33 (Figure 5.42):

Material:

Heated Camden	12	Unheated Tuscaloosa	1
Unheated Camden	17	Heated Tuscaloosa	1
Ft. Payne	1	Hematite	1

Discussion: Of the 30 cores recovered that were flaked around approximately 90° of a margin, 27 were unifacial and 3 were bifacial. Most of these are cobbles or pebbles that have flakes removed, using primarily the natural cortex as the striking platform. Occasionally, specimens were partially decorticated to prepare a platform for flake detachment. Flake scars are generally large and non-patterned, indicating that elaborate core preparation techniques were rarely if ever used. Many of these specimens appear to have been used other than for a flake source, as indicated by crushed and battered edges. Ahler (Appendix III) notes that many "cores" undoubtedly served *in multiple* activities, placing them within a "core tool" technology that was based on local Camden gravels. Most, if not all, appear to be produced by hard hammer percussion.

180° Core n = 25 (Figures 5.42 and 5.43):

Material:

Heated Camden	7	Unheated Tuscaloosa	1
Unheated Camden	13	Ft. Payne	1
Heated Tuscaloosa	1	Conglomerate	2

Discussion: A medium-sized to large sample of 180° Cores was recovered. On five specimens the flaking was unifacial and opposing, on one it was bifacial opposing, on 17 it was unifacial adjacent, and on two it was bifacial adjacent. Both the technique of core reduction and functional variation within this group is like that of the 90° Cores.

270° Core n = 14 (Figure 5.43):

Material:

Heated Camden	4	Unheated Camden	8
Ft. Payne	1	Unidentified	1

Discussion: Of the 14 cores that have been flaked approximately 270° around a margin, 12 were unifacially flaked and only 2 were bifacially flaked. They are similar in technology and apparently in function to the other core categories.

360° Core n = 14 (Figure 5.44):

Material:

Heated Camden	4	Ft. Payne	1
Unheated Camden	9		

Discussion: Of the 360° cores eight were unifacially flaked and six were bifacially flaked. The similarity to the other core categories is evident in terms of technology and use.

Bipolar Core n = 6 (Figure 5.44):

Material:

Heated Camden	5	Ft. Payne	1

Discussion: These cores are generally rectilinear to ovoid in shape, small in size, and possess opposed battered platforms and sheared force cones. These are inferred to have been produced by a bipolar flaking technique. Some of these closely resemble the "marble" core described by Ahler (Appendix III).

Blade Core n = 1 (Figure 5.44):

Material:

Unheated Camden	1

Discussion: Only one artifact was tentatively classified as a "blade" core. It possesses regular contiguous blade-like removals around one-quarter to one-half of the margin.

Microblade Core n = 3 (Figure 5.44):

Material:

Heated Camden	1	Conglomerate	1
Unheated Tuscaloosa	1		

Discussion: The microblade cores possess regular, narrow, blade-like removals from a single platform. These removals are diminutive in size and this separates these cores from the regular blade core above.

Core Other n = 3 (Figure 5.44):

Material:

Unheated Camden	1	Blue-Green Bangor	1

Discussion: Two specimens were cores that did not fit the established categories. These are amorphous, battered specimens which appear to be exhausted.

Core Fragments n = 114 (not illustrated):

Material:

Heated Camden	63	Tallahatta Quartzite	1
Unheated Camden	39	Pickwick	1
Ft. Payne	5	Conglomerate	2
Unheated Tuscaloosa	1	Unidentified	1

Discussion: A large sample of blocky, amorphous chert fragments was classified as by-products of core production and use. These are fragmentary, usually broken, and possess a platform or remnants of a platform along with irregular flaking.

Scrapers

The measurement data for Scrapers are presented in Table 5.20.

Uniface Side Scraper n = 62 (Figure 5.45):

Material:

Heated Camden	43	Unheated Tuscaloosa	1
Unheated Camden	10	Pickwick	1
Ft. Payne	4	Unidentified	2
Heated Tuscaloosa	1		

Discussion: Uniface side scrapers were manufactured primarily on flakes. Based on flake morphology, three subcategories were designated and quantified: those made on blade/blade-like flakes (n = 7), expanding flakes (n = 14), and "other" flakes (n = 39). In addition, two side scrapers were made on thermal spalls.

The majority of the specimens exhibit heat treatment. The flake blank on which they were made appears to have been intentionally produced in most cases. A few of the flake-blanks are blade-like in nature, suggesting a blade technology.

The steep, unifacial retouch is confined to the lateral margins of the flakes and consists of contiguous, diminutive, flake scars. Macromorphological use-wear is also present on certain specimens, generally in the form of hinge and step fracturing, as well as some scalar scarring.

As noted by Ahler (Appendix III) these scraper categories are based on edge morphology and some examples undoubtedly served other uses.

Uniface End Scraper n = 48 (Figures 5.45 and 5.46):

Material:

Heated Camden	38	Fossiliferous Ft. Payne	1
Unheated Camden	5	Unheated Tuscaloosa	1
Ft. Payne	3		

Discussion: Uniface end scrapers were made primarily on flakes. A breakdown of flake-blank morphology indicates that 3 were made on blade/blade-like flakes, 22 on expanding flakes, 22 on "other flakes, and 1 on a thermal spall. These specimens are similar in manufacture and use-wear to the side scrapers except that more are hafted implements. The unifacial retouch is restricted to the distal ends of the flakes, and the retouch is transverse to the bulbar axis. A bias toward the use of expanding flakes as blanks is apparent in the Walnut site sample. Many of these are similar to the hafted end scraper forms.

Uniface Side-End Scraper n = 35 (Figure 5.45):

Material:

Heated Camden	26	Ft. Payne	6
Unheated Camden	2	Unheated Tuscaloosa	1

Discussion: Uniface side-end scrapers possess attributes similar to the preceeding scraper categories; the major difference is the presence of both steep lateral and distal unifacial retouch. A breakdown of the flake-blank morphologies is as follows: blade/blade-like flake (3), expanding flake (12), other flake (19), thermal spall (1). Similar methods of manufacture and use are posited for this category as for the previous uniface categories.

Biface Hafted End Scraper n = 3 (Figure 5.46):

Material:

Ft. Payne	1	Heated Camden	2

Discussion: One of the examples of a bifacial hafted end scraper was recycled, perhaps from a Benton point. A steeply retouched, transverse edge is present along a transverse fracture. This is opposed by a hafting area comprised of two shallow side notches.

Uniface Cobble Scraper n = 1 (Figure 5.46):

Material:
Unheated Tuscaloosa 1

Discussion: A single diminutive pebble was recovered with a steep, unifacially flaked edge.

Scraper on Biface Fragment (Recycled) n = 14 (Figure 5.46):

Material:

Heated Camden	7	Ft. Payne	7

Discussion: Bifaces that had been recycled into scrapers generally, had steep, abrupt flaking on a fractured edge.

Scraper on a Core (Recycled) n = 1 (Figure 5.46):

Material:
Unheated Camden 1

Discussion: A single core was found with a steep, retouched edge. It had evidently been recycled for use as a scraper.

Notched Flake/Spokeshave n = 21 (Figures 5.46 and 5.47):

Material:

Heated Camden	15	Ft. Payne	3
Unheated Camden	2	Pickwick	1

Discussion: Notched flake/spokeshaves were usually manufactured on flakes. Each possess a steeply retouched, narrow concavity on a margin. It appears that a pressure technique was used to accomplish the initial notching; however, some of the small flake removals may have been a result of use.

Unidentifiable Scraper Fragment n = 23 (not illustrated):

Maaterial:

Heated Camden	16	Ft. Payne	3
Unheated Camden	4		

Discussion: Unidentifiable scraper fragments were broken to the extent that a macromorphological assessment of their overall shape was not possible. All possess at least one steeply retouched edge segment.

Scraper (Other) n = 1 (Figure 5.46):

Material:
Heated Camden 1

Discussion: This scraper is steeply retouched and intact, but does not conform to other scraper categories.

Ovoid Biface Scraper n = 1 (Figure 5.46):

Material:
Heated Camden 1

Discussion: This specimen is a steeply retouched ovoid biface made on a flake.

Biface Scraper on a Flake n = 4 (Figure 5.46):

Material:

Heated Camden	2	Tallahatta Quartzite	1
Ft. Payne	1		

Discussion: These specimens are bifacially retouched flakes with both lateral and distal edge modification.

Graver/Scraper n = 1 (Figure 5.46):

Material:
  Heated Camden 1

Discussion: This graver/scraper made on a flake has a steeply retouched, narrow projection adjacent to a steeply retouched, unifacial edge.

Uniface Hafted End Scraper n = 3 (Figure 5.47):

Material:
  Heated Camden 3

Discussion: Uniface scrapers made on flakes exhibit macroscopic evidence of haft modification on the proximal end. These are similar to the other uniface flake scraper categories, but the obvious haft modification differentiates them.

Ovoid Biface Scraper (Recycled) n = 1 (Figure 5.47):

Material:
Ft. Payne 1

Discussion: This ovoid scraper has steeply retouched, bifacial edges and appears to be made on a projectile point/knife fragment.

Hafted End Scraper (Recycled) n = 3 (Figure 5.47):

Material:

Heated Camden	2	Ft. Payne	1

Discussion: These specimens exhibit a steeply retouched, transverse edge and appear to be reworked on projectile point/knives.

Drills, Perforators, Reamers

The measurement data for Drills, etc. are presented in Table 5.21.

Shaft Drill n = 26 (Figure 5.47):

Material:

Heated Camden	15	Fossiliferous Ft. Payne	1
Unheated Camden	1	Unidentified	1
Ft. Payne	8		

Discussion: Shaft Drills are cylindrical in cross section and elongated with tapering ends. Edge crushing is generally visible on lateral margins. Most are made from heated Camden chert.

Expanding Base Drill n = 35 (Figure 5.48):

Material:

Heated Camden	20	Fossiliferous Ft. Payne	1
Unheated Camden	3	Unidentified	1
Ft. Payne	10		

Discussion: Expanding Base Drills are essentially like the shaft drills except the proximal end of the tool is expanded, evidently for hafting.

Stemmed Drill (Recycled) n = 19 (not illustrated):

Material:

Heated Camden	8	Ft. Payne	9
Unheated Camden	2		

Discussion: Stemmed Drills appear to have been recycled from projectile point/knives; however, it is possible that some of these may have been originally manufactured as drills.

Drill Fragment - Distal n = 75 (not illustrated):

Material:

Heated Camden	33	Tallahatta Quartzite	1
Unheated Camden	4	Novaculite	1
Ft. Payne	35	Unidentified	1

Discussion: Distal Drill Fragments are fractured on one end and possess a single tapered end. They represent sheared, distal portions of drills.

Drill Fragment - Medial n = 72 (not illustrated):

Material:

Heated Camden	23	Ft. Payne	47
Unheated Camden	2		

Discussion: Fractured medial drill sections possess opposing fractured surfaces and represent remnants of discarded drills.

Reamer n = 8 (Figure 5.48):

Material:

Heated Camden	5	Unheated Tuscaloosa	1
Unheated Camden	1	Ft. Payne	1

Discussion: Reamers are elongate tools, triangular in cross section with both unifacial and bifacial retouch. They are segregated from the drill categories by size and thickness. They appear to have been hand held as evidence for haft modification is not present.

Perforator n = 30 (Figure 5.49):

Material:

Heated Camden	21	Fossiliferous Ft. Payne	1
Unheated Camden	2	Tallahatta Quartzite	1
Ft. Payne	5		

Discussion: Perforators were generally made on flakes by unifacial pressure flaking to produce a sharp, thin projection. An occasional specimen was bifacially retouched. All appear to have been hand held.

Graver n = 14 (Figure 5.49):

Material:

Heated Camden	7	Hematite	1
Ft. Payne	2	Petrified Wood	1
Ferruginous Sandstone	3		

Discussion: Gravers were made on flakes by unifacial pressure flaking on a very short, sharp projection. These differ from perforators primarily by the length of the projection.

Microlith n = 3 (Figure 5.49):

Material:

Heated Camden	3

Discussion: A few examples of minute, pressure retouched artifacts resembling drills or perforators were recovered. At least two appear to be made on blades, and two are unifacially retouched.

Denticulate n = 5 (Figure 5.49):

Material:

Heated Camden	3	Ft. Payne	1
Unheated Camden	1		

Discussion: Serrated flakes or denticulates consist of flakes with an intentionally serrated, saw-like edge, produced by unifacial or bifacial pressure flaking.

Micro-Perforator *n* = 1 (Figure 5.49):

Material:
Ft. Payne 1

Discussion: Micro-Perforators are similar to the perforator category except they are smaller.

Reamer (Recycled) *n* = 2 (Figure 5.49):

Material:

Ft. Payne	1	Pickwick	1

Discussion: The two examples of projectile point/knives that had been reworked into reamers were apparently hafted and possess a narrow, thick, rod-like working edge.

Perforator (Recycled) *n* = 2 (Figure 5.49):

Material:

Heated Camden	1	Ft. Payne	1

Discussion: Of the two examples of projectile point/knives that had been reworked into perforators, one appears to have been hafted, while the other was probably hand held.

Other Uniface and Biface Tools

The measurement data for Uniface and Biface Tools are presented in Table 5.22.

Uniface Chopper *n* = 9 (Figure 5.49):

Material:

Unheated Camden	8	Unheated Tuscaloosa	1

Discussion: Uniface choppers were manufactured on cobbles, primarily by hard hammer percussion. All examples are large, massive, and unheated. They exhibit heavily crushed and battered edges.

Biface Chopper *n* = 22 (Figure 5.50):

Material:

Heated Camden	2	Quartzite	1
Unheated Camden	14	Pickwick	2
Unheated Tuscaloosa	1	Ferruginous Sandstone	1
Ft. Payne	1		

Discussion: Biface choppers possess a massive bifacial edge characterized by crushing and blunting. They were primarily made on unheated cobbles.

Uniface Adze $\underline{n}$ = 8 (Figure 5.51):

Material:

Heated Camden	2	Conglomerate	1
Unheated Camden	3	Siltstone	1
Quartzite	1		

Discussion: Uniface adzes were made primarily on cobbles of unheated Camden chert. A single transverse working edge is marked by numerous step fractures, edge blunting, and crushing. No clear hafting modification is evident on these specimens.

Biface Adze $\underline{n}$ = 6 (Figure 5.50):

Material:

Heated Camden	3	Ft. Payne	1
Unheated Camden	1	Conglomerate	1

Discussion: Of the six bifacial adzes recovered, two were fractured medially, leaving only the butt, which exhibits heavy grinding and polishing along the lateral edges. This indicates that they were hafted. The remaining four were fractured, but each retained a convex bifacial edge with macroscopic wear patterns like those of the unifacial variety.

Uniface Flake Knife $\underline{n}$ = 35 (Figure 5.51):

Material:

Heated Camden	24	Ft. Payne	2
Unheated Camden	8		

Discussion: Uniface flake knives were unifacially retouched by either a pressure or light percussion technique. The retouching is usually confined to the lateral margin or margins of the flake. The flakes are of varied forms: blade-like, expanding, and amorphous. The retouch is contiguous along an edge, and the angle of the working edge is relatively acute, generally less than 45°.

Biface Flake Knife $\underline{n}$ = 33 (Figure 5.51):

Material:

Heated Camden	24	Ft. Payne	4
Unheated Camden	3	Fossiliferous Ft. Payne	1
Unheated Tuscaloosa	1		

Discussion: Bifacially retouched flakes are similar in morphology to the Uniface Flake Knives and appear to be closely related both functionally and technically.

Uniface Cobble Knife n = 1 (Figure 5.51):

Material:
  Unheated Camden 1

Discussion: The one unifacial, acute edged-trimmed cobble possesses a continuous row of small flake scars forming the working edge.

Biface Cobble Knife n = 2 (Figure 5.52):

Material:
  Heated Camden 2

Discussion: The two examples of a bifacially retouched cobble possess an acute working edge and are segregated from the Uniface Cobble Knife by the presence of a bifacial edge.

Biface Digging Implement n = 1 (Figure 5.52):

Material:
  Ferruginous Sandstone 1

Discussion: One example of a heavy, ferruginous sandstone implement was recovered. It possesses a sinuous, bifacially flaked, transverse edge. No modification for hafting is present.

Unidentifiable Chipped Stone Fragments n = 4405 (not illustrated):

Material:

Heated Camden	2231	Blue-Green Bangor	1
Unheated Camden	241	Quartzite	2
Heated Tuscaloosa	34	Pickwick	5
Unheated Tuscaloosa	9	Novaculite	1
Ft. Payne	1737	Ferruginous Sandstone	7
Fossiliferous Ft. Payne	40	Conglomerate	9
Tallahatta Quartzite	39	Hematite	1
Quartz	6	Siltstone	1
Fossiliferous Bangor	6	Unidentified	35

Discussion: A large quantity of unidentifiable chipped stone fragments was recovered. These consist of both miscellaneous uniface and biface fragments which could not be confidently assigned to an established macromorphological category. As pointed out by Ahler (Appendix IIIE.,pp.15), most of these fragments could be properly designated to a techno-functional category with

more intensive analysis. Most appear to be small pieces of bifacial implements, such as projectile point/knives, preforms, or biface blades.

<u>Other-Uniface-Biface</u> <u>n</u> = 1 (not illustrated):

Material:
Ft. Payne 1

Discussion: One unusual flake tool has a steeply retouched unifacial edge opposite the bulb along with an acute unifacial edge. This may point to a possible multiple function for the tool.

<u>Wedge</u> <u>n</u> = 12 (Figure 5.52):

Material:

Heated Camden	5	Ft. Payne	3
Unheated Camden	4		

Discussion: Rectangular to ovoid wedges possess at least one transverse working edge perpendicular to the long axis of the tool. They are thick in cross section and possess macroscopic traces of wear including step flaking and crushing. Flaking is bifacial on five examples and unifacial on the remainder.

<u>Chopper/Hammerstone</u> <u>n</u> = 3 (Figure 5.52):

Material:

Unheated Camden	2	Conglomerate	1

Discussion: One example of a large piece of conglomerate has a rough bifacial edge created through hard hammer percussion. Other areas of the tool are battered and crushed, suggesting impact with hard material.

<u>Chisel</u> <u>n</u> = 5 (Figure 5.52):

Material:

Unheated Camden	3	Ft. Payne	1
Heated Tuscaloosa	1		

Discussion: Five convex edged chisels were recovered. These are narrow and thick, possessing at least one transverse working edge exhibiting step flaking and crushing. Three are bifacially worked and the others are unifacially worked.

<u>Biface Flake Knife/Spokeshave</u> <u>n</u> = 1 (not illustrated):

Material:
Heated Camden 1

Discussion: The one example recovered possesses a narrow unifacial notch along with an unifacially retouched acute, edge.

Piece Esquille n = 5 (Figure 5.52):

Material:

Heated Camden	3	Heated Tuscaloosa	1
Ft. Payne	1		

Discussion: A few examples of splintered chert pieces were recovered which possessed a chisel-like edge. These had opposing crushed areas and long blade-like scars running the entire length of the tool. They were apparently functional implements produced with a bipolar flaking technique.

Piece Esquille on Biface (Recycled) n = 3 (Figure 5.52):

Material:

Heated Camden	2	Ft. Payne	1

Discussion: Three examples of bifaces were bipolarly retouched to produce a rectangular, chisel-like implement. These are essentially like regular splintered wedges; the only difference is the recycled nature of the tool.

Debitage

A total of 98,382 nonutilized flakes or debitage was recovered from the Walnut site. In addition, another 3,791 flakes were found that exhibited evidence of use.

Counts and weights for three flake sizes were recorded in addition to the materials comprising each size category. The nonutilized flakes include: 1-inch flakes (n = 360), 0.5-inch flakes (n = 14,882), 0.25-inch flakes (n = 83,040). Utilized flakes were broken down as follows: 1-inch flakes (n = 72), 0.5-inch flakes (n = 1,793), and 0.25-inch flakes (n = 1,926).

The debitage is comprised mainly of local Camden chert which had been heated. This category composes 66.7 percent of the three size groupings. Unheated local Camden chert comprises 16.1 percent, and Blue-Grey Ft. Payne 11 percent of the debitage recovered. These three chert types represent 93.8 percent of the major debitage categories at the Walnut site. Ferruginous sandstone represented 1.8 percent; other material types make up generally less than one percent each. The major exotic types in-

clude fossiliferous Ft. Payne at 0.4 percent, Bangor at 0.1 percent, and Tallahatta quartzite at 0.2 percent. Minor exotic types, each with an occurrence of less than a tenth of one percent, included novaculite, agate, quartz, greenstone, chalcedony, Pickwick chert, and possibly Flint Ridge chert. Unidentified material comprises 0.7 percent of the collection.

In addition to the three major flake size categories, "other" debitage categories are: (1) utilized and nonutilized prismatic blades and blade-like flakes; few of which, however, meet the requirement for prismatic blades; (2) utilized chert/chunks (amorphous flakes, shatter, and spalls attributable to either the chert knapping process or heat spalling); and (3) Debitage-Other. The latter category contains material which does not conform to any of the above groupings.

The majority of the debitage as noted consists of 0.25-inch or smaller heated Camden flakes. Larger 0.5-inch and 1-inch cortical and non-cortical flakes were also recovered. Most of the large 1-inch flakes are of unheated Camden, while heated Camden comprises the majority of the 0.5-inch and 0.25-inch flakes. Exotic cherts are almost invariably found within the small 0.25-inch flakes. This is apparent in the Blue-Grey Ft. Payne category where only 0.1 percent are 1-inch in size, 9 percent 0.5-inch in size, and the remaining 91 percent 0.25-inch in size or smaller.

Ground Stone

A total of 2,087 pieces of ground stone were recovered from the Walnut site. The majority were Unidentifiable Ground Stone Fragments (n = 1,757). The remaining include a wide range of tools. The measurement data for Ground Stone is presented in Table 5.23. The following categories of ground stone tools were not measured: Worked Hollow Sandstone Concretion, Ground Limonite, Ground Hematite, Unident Ground/Polished Stone Fragment, and Other(Ground Flake).

Hammerstone n = 52 (Figure 5.53)

Material:

Unheated Camden	21	Conglomerate	6
Heated Camden	3	Ferruginous Sandstone	2
Quartzite	19	Ft. Payne	1

Discussion: Hammerstones are almost invariably cobbles or pebbles which exhibit localized areas of pecking, battering, and crushing. This use-wear ranges from minute to extensive.

Anvilstone $\underline{n} = 4$ (Figure 5.53)

Material:

Ferruginous Sandstone	3	Sandstone	1

Discussion: Pecked, tabular, ferruginous sandstone pieces exhibit roughened, slightly pecked surfaces, often with linear areas of wear.

Pitted Anvilstone $\underline{n} = 25$ (Figure 5.53)

Material:

Ferruginous Sandstone	17	Quartzite	1
Sandstone	5	Unheated Camden	1
Conglomerate	1		

Discussion: Pitted anvilstones are characterized by one or more localized pecked and battered depressions or "cups." The cups vary in depth from deep (6-7 mm) to shallow (1-2 mm) and are generally 20 to 30 mm wide.

Hammer/Anvilstone $\underline{n} = 5$ (Figure 5.53)

Material:

Unheated Camden	1	Quartzite	1
Ferruginous Sandstone	3		

Discussion: These pecked and ground stone tools exhibit physical attributes of both the hammerstone and anvilstone categories. Both depressions and localized pecked and battered areas are present.

Abrader $\underline{n} = 27$ (Figure 5.53)

Material:

Ferruginous Sandstone	15	Siltstone	6
Sandstone	3	Hematite	3

Discussion: Abraders possess localized, broad, smoothed or abraded areas, sometimes of a linear or grooved nature.

Muller $\underline{n}$ = 17 (Figure 5.54)

Material:

Ferruginous Sandstone	12	Sandstone	1
Quartzite	2	Conglomerate	2

Discussion: Sandstone mullers have large, convex to flattened, ground surfaces on one or more faces.

Mortar $\underline{n}$ = 16 (Figure 5.54)

Material:

Ferruginous Sandstone	11	Sandstone	5

Discussion: Mortars possess large, shallow (1-3 mm) or deep (8-10 mm) concavities which are conical in nature. The concavities are pecked and/or ground over most of their surfaces.

Pestle $\underline{n}$ = 1 (Figure 5.54)

Material:

Conglomerate 1

Discussion: The one bell-shaped pestle recovered has a long, cylindrical portion attached to a flattened and expanded grinding surface.

Grooved Axe $\underline{n}$ = 2 (Figure 5.54)

Material:

Ferruginous Sandstone	1	Quartzite	1

Discussion: The two examples of pecked, ground, and polished hafted axes possess highly polished transverse bits and three pecked and abraded grooves; two opposite each other on the lateral margins and one on the margin opposite the working edge. The larger specimen was not measurable due to a large fracture on the bit; however, it is approximately twice the size of the small specimen.

Celt $\underline{n}$ = 2 (Figure 5.54)

Material:
Ferruginous Sandstone 1 Sandstone 1

Discussion: The two fragmentary examples of ground and polished celts have only a portion of a highly polished transverse bit remaining.

Gorget $\underline{n}$ = 1 (Figure 5.54)

Material:
Siltstone 1

Discussion: The one fragmentary specimen recovered exhibits finely ground surfaces, an elongated rectangular shape, and a thin cross-section. It had been fractured, leaving approximately 1/3 of the implement.

Bead $\underline{n}$ = 15 (Figure 5.55)

Material:

Hematite	10	Jasper	1
Siltstone	3	Unidentified	1

Discussion: Drilled and highly polished stone beads of three kinds were found. Most are discoidal in shape, but a few are tubular, and one is zoomorphic.

Atlatl Weight $\underline{n}$ = 7 (Figure 5.54)

Material:
Hematite 6 Siltstone 1

Discussion: Atlatl weights possess at least remnants of a drill hole and are highly polished. Two possess holes drilled through at the center. Four are in fragmentary condition.

Worked Hollow Sandstone Concretion $\underline{n}$ = 1 (Figure 5.55)

Material:
Ferruginous Sandstone 1

Discussion: The one fragmented natural sandstone concretion is pecked and ground on the outer surface creating a cylindrical object.

Ground Limonite $\underline{n} = 12$ (not illustrated)

Material:
Limonite 12

Discussion: The ground and slightly polished limonite pieces are tabular in form.

Ground Hematite $\underline{n} = 35$ (not illustrated)

Material:
Hematite 35

Discussion: The ground and slightly polished hematite pieces are tabular in form.

Unidentifiable Ground/Polished Stone Fragment $\underline{n} = 1,757$ (Figure 5.55)

Material:

Ferruginous Sandstone	1137	Petrified Wood	3
Sandstone	393	Siltstone	82
Conglomerate	36	Quartzite	5
Hematite	77	Heated Camden	1
Limonite	9	Unidentified	2
Greenstone	10		

Discussion: These broken, pecked, ground or polished stone fragments appear to be fragments of larger ground stone implements.

Other - Ground Flake $\underline{n} = 42$ (not illustrated)

Material:
Ferruginous Sandstone 31 Sandstone 11

Discussion: These flakes are ground on the dorsal surfaces and appear to be derived from ground stone tools, as either resharpening flakes or fortuitous flakes.

Muller/Pitted Anvilstone $\underline{n}$ = 5 (Figure 5.55)

Material:
Ferruginous Sandstone 5

Discussion: The Muller/Pitted Anvilstones possess both conical depressions and flat to convex grinding surfaces.

Drill Core $\underline{n}$ = 5 (Figure 5.55)

Material:
Hematite 3 Quartzite 2

Discussion: Drill cores are the by-products of stone drilling and are small "cores" cylindrical in shape and tapered at one end.

Bead Preform $\underline{n}$ = 3 (Figure 5.55)

Material:
Siltstone 3

Discussion: These pieces of ground siltstone may represent an intermediate stage of bead manufacture. One is rectilinear and the others are disc shaped.

Anvilstone/Chopper $\underline{n}$ = 1 (Figure 5.55)

Material:
Conglomerate 1

Discussion: The one anvilstone/chopper recovered has a unifacial chopping edge and a pecked surface.

Ground Projectile Point/Knife $\underline{n}$ = 1 (not illustrated)

Material:
Ft. Payne 1

Discussion: This specimen is a medial section of a projectile point/knife with a heavily ground margin.

Tubular Pipe $\underline{n} = 1$ (Figure 5.55)

Material:
Hematite 1

Discussion: The one fragmented, tubular pipe is drilled longitudinally and had been broken along the drill hole.

Mortar/Anvilstone $\underline{n} = 2$ (Figure 5.56)

Material:
Ferruginous Sandstone 2

Discussion: These two specimens are tabular, sandstone pieces possessing marks from pecking and battering, and a shallow concave depression.

Mortar/Pitted Anvilstone $\underline{n} = 1$ (Figure 5.56)

Material:
Ferruginous Sandstone 1

Discussion: This anvilstone is tabular and possesses both small conical depressions and a wide, shallow concavity.

Pitted Anvilstone/Abrader $\underline{n} = 2$ (Figure 5.56)

Material:
Ferruginous Sandstone 2

Discussion: The single pitted anvilstone/abrader exhibits two small pecked depressions and a long narrow groove.

Grooved Abrader/Hammerstone/Pitted Anvilstone $\underline{n} = 1$ (Figure 5.56)

Material:
Ferruginous Sandstone 1

Discussion: The specimen in this category exhibits attributes of three other categories: hammerstone, pitted anvilstone, and grooved abrader.

Awl $\underline{n}$ = 2 (Figure 5.56)

Material:
Petrified Wood 2

Discussion: The two awls are made on slender pieces of petrified wood and possess a needle-like ground tip.

Other

Introduced Rock and Miscellaneous Fired Material

A total of 500,295 g of introduced rock was recovered in the excavation blocks and test units at 22IT539. In addition, 115,160 g of fired clay and daub were recovered. The majority of the introduced rock consists of highly ferruginous sandstone fragments. It is difficult to determine if this material has been fired, but this is suspected because of its discolored surfaces.

Fire cracked chert is another major component of this group. These pieces are heat spalls, which often retain potlid fractures and crazed surfaces caused by firing. The sandstone and fire cracked chert compose almost 93% of the introduced rock by weight.

Other major introduced rock categories include: coal, chalk, cobble/pebbles, conglomerate, hematite and limonite, petrified wood, quartzite, and siltstone.

The distribution of this material is presented by weight in Appendix I.

Historic Remains

A total of 200 historic material fragments was recovered in the surface collection, features blocks, and test units at the Walnut site. The majority ($\underline{n}$ = 133) came from the upper three levels of Block C. These materials were generally confined to the upper two levels of the site.

The historic artifact inventory consists primarily of metal fragments with minor amounts of ceramic and glass. All of the material is of relatively recent or modern origin, most likely associated with the historic land uses discussed earlier. The horizontal and vertical distribution of this material by category is presented in Tables 5.24 - 5.26.

BIOTIC REMAINS

Both floral and faunal remains were recovered at the Walnut site. These consist primarily of charred floral remains and burned bone fragments. They were recovered from a variety of contexts and are discussed separately below.

Flora

A large amount of charred botanical remains consisting primarily of charred hickory nut and charred wood fragments were recovered. Due to project constraints, a sample of the recovered material was sent to a consultant archaeologist for identification. Flotation samples were analyzed from selected features and control blocks. Five levels from Unit 128S/88W in Block A and three levels in Block B were sampled for botanical samples. In addition, 11 features which would represent the best contextual data from the site were selected for analysis. Chapter 4 contains an explanation of the methods and techniques used in the floral analysis and recovery.

Blocks A and B

The results of the floral analysis from Block A and B are presented in Table 5.27. A rough correspondence between level and cultural affiliation may be made by stratigraphic position. Due to bioturbation and other forms of disturbance, these results may not be representative of the plant utilization from a particular cultural period. They are best viewed as qualitative data which may indicate the presence or absence of a particular species in the diet.

Level 3 in Block A represents mixed Late Archaic/Gulf Formational/Woodland components. In the Benton zone (Level 7) the recovered remains were hickory nutshell and wood fragments. Some of the wood fragments are identified as pine. In Level 9, Segment A may correspond to either a Benton or Sykes-White Springs affiliation; it contained charred hickory nutshell with some pine and oak wood fragments. There was not much difference between Levels 12 and 9 in species composition, which may be attributable to both levels being Sykes-White Springs occupations. Level 16 represents the Eva-Morrow Mountain occupation at the site. The botanical remains from this level do not differ from the above levels which consisted almost entirely of charred hickory nutshell fragments.

The botanical remains in Block B Levels 6 and 7 contained fragments of acorns and one pokeweed seed. The amount of hickory nutshells in this block was much greater than in Block A at the same levels (Benton). Wood fragments were also present.

Features

Botanical remains were analyzed from 11 features. The most prevalent item was charred hickory nutshell fragments. Minor amounts of acorn, wood fragments, and a few seeds also were recovered. The results of the analysis from the features are presented in Table 5.27.

Feature 142, a Benton pit, contained more botanical material than the other features. This sample, as were the others, was dominated by hickory nut fragments. It contained a grape seed (Vitis), a persimmon fragment (Diospyros), and hardwood fragments.

Samples from three prepared areas were submitted, Feature 6 (Benton), Feature 73 (Sykes-White Springs/Benton), and Feature 120 (Sykes-White Springs). Feature 6 contained hickory nut fragments and wood fragments. Feature 73, in addition to hickory nut and wood fragments, contained one pokeweed seed (Phytolacca) and a single hackberry seed (Celtic). Feature 120 contained walnut fragments (Juglans), fern spores, a persimmon seed (Diospyros), unidentifiable seed fragments, hickory nutshell, and wood fragments.

The remaining feature samples were collected from a Benton pit (Feature 9), a Miller III pit (Feature 5), a probable Middle-Late Archaic fired aggregate (Feature 95), a probable Middle Archaic hearth (Feature 117), a probable Middle Archaic botanical cluster (Feature 94), and a probable Middle to Late Archaic pit (Feature 93). These samples contained almost exclusively hickory nutshell fragments and wood fragments; a few seeds or seed fragments were also recovered.

The ubiquity of charred hickory nut fragments in the sample suggest that they were likely used for both the extraction of oil and use as fuel. The higher weight of the hickory nut fragments is probably a function of preservation. Their use as a fuel would enhance preservation.

Summary of Floral Remains

All species recovered could have been collected in the floodplain, on the slopes, or in the adjacent uplands. The lack of an appreciable number of seeds in the sample may indicate a closed canopy over the site during much of the prehistoric occupation. Large cleared areas are not suggested by the evidence.

The limited seasonal data suggests that persimmon, grape, and hackberry were probably collected during the summer and fall. Acorns, walnuts, and hickory nuts would be gathered in the fall and either stored or immediately consumed. Evidence for storage is lacking at the Walnut site; however, it may be possible that limited storage took place.

Fauna

A total of 14,395 faunal fragments from the Walnut site was analyzed by Bogan. These were recovered from the blocks and test units. In general, the sample contained calcined and broken bone fragments. The level of identification was low for this large sample because the remains were so fragmented. The analytical methods and techniques used for the faunal identification are stated in Chapter 4. All 0.25 inch material from 22IT539 was analyzed, but because of time and funding constraints only a sample of the 0.125 inch bone remains were sorted and analyzed. Due to the difficulty in identifying species, the assemblage is best viewed as a qualitative data set. Quantitative changes are evident in the amount of bone density between levels, but it is not clear if this is a result of preservation or procurement strategies.

The identifiable faunal material consisted of mammal (large and small), bird, reptile, and fish skeletal material (Table 5.28). The distribution of these remains is presented in Tables 5.29 - 5.34.

Block A

A total of 159 fragments was recovered from the 0.25 inch sample from Block A (Table 5.28). An additional 1,336 were found in the 0.125-inch sample. Most fragments were unidentifiable mammal remains. The majority of these was found in Levels 11 through 15, especially Levels 11, 14 and 15. Recognizable animal remains include the eastern box turtle, slider/map/painted turtle, and

catfish. Fragments of unidentifiable turtle, snake, and fish bone were also recovered.

Block B

The majority of the faunal remains from Block B consisted of unidentifiable mammal bones from Level 10 (Table 5.29). Individual animals represented include opossum, elk, and bowfin. Almost all analyzed bone was from the 0.25-inch screen. There were no faunal remains from the 0.125-inch screen for Block B.

Block C

The largest amount of recovered faunal material was from Block C. A total of 1,381 pieces was analyzed from the 0.25-inch sample (Table 5.30). An additional 740 pieces of 0.125-inch bone were analyzed from Levels 10 through 13. The upper four levels contained a moderate amount of bone, while Levels 5 through 8 contained low amounts. Then there is a dramatic increase in faunal material in Levels 11 through 13 with Level 12 containing the most bone. There is a noticeable increase in bone counts in the animals represented in the sample. These include woodchuck, raccoon, white-tailed deer, turkey, mud/musk turtle, softshell turtle, and poisonous and nonpoisonous snakes. Fragments of indeterminate turtle, fish, and bird bone supplement this list. Remains of domestic pig were recovered in the upper 30 cm of this block and are considered to be of present origin.

The most noticeable trend in this block is the increased amount and diversity of bone in Levels 10 through 13. These quantitative differences may be a reflection of preservation in this portion of the site rather than differences in procurement strategies. Intensive cooking, as shown by the fired aggregate and prepared area features and by the great amounts of charcoal, is the likely cause of this increase in faunal material in this portion of the deposits. The large prepared area (Feature 120) comprised a good deal of the block in these levels. It is possible that an activity area such as a food processing and/or cooking area could conceivably coincide with the prepared areas. Other areas of the site which contained prepared areas such as those in Blocks A and D, also contained relatively large amounts of calcined bone fragments in their general vicinity.

Block D

A total of 190 pieces of faunal material was recovered from the 0.25-inch screen in Block D (Table 5.31). Most of is was indeterminate mammal bone. Indeterminate bird and turtle remains were also found. Recognized animals include eastern cottontail, white-tailed deer, eastern box turtle, and nonpoisonous snake.

Vertical distribution data is limited because major excavations did not commence in this block until Level 10. It appears that a thin band of charred botanical and occasional fired aggregate materials lies just above the Eva-Morrow Mountain zone in this portion of the block (Zone V, Figure 5.14).

Test Units

The majority of the bone recovered from the test units was from Unit 102S/87W, a 1 m by 2 m unit, on the northeastern edge of the site. Table 5.32 presents the distributional data for the analyzed samples. The largest recovered amount was indeterminate mammal bone. Additional large amounts of indeterminate fish, turtle, and bird bone were also recovered. Animals recognized in the sample, which primarily came from Levels 11 through 16, include white-tailed deer, squirrel, mouse, passerine bird (bunting), turkey, nonpoisonous snake, bowfin, and catfish. This small unit, in Levels 11 through 17, produced the most diverse species list from the site and included large amounts of fish bone. All of the sample was recovered in the 0.125-inch screen.

The other three units (122S/146W, 118S/103W, and 146S/69W) produced minimal faunal remains, mostly indeterminate mammal bone. White-tailed deer, eastern box turtle, slider/map/painted turtle, nonpoisonous snake, and indeterminate turtle remains were also recovered.

Features

A moderate amount of bone ($\underline{n}$ = 360) was recovered from feature contexts at the Walnut site. Their distribution from the 0.25-inch screen is presented in Table 5.34. The prime component of the feature faunal assemblage was indeterminate mammal bone. The majority of the faunal remains were from Features 77, 89 120, 125, and 142. Features 107, 125, 146, and 151 which had high bone counts were all burial pits, and many of these bone fragments may be human.

Features 142, 97, and 77 contained the largest number of bone fragments and species represented outside the burial pits. Dog and white-tailed deer were recovered from these. An elk or bison fragment was found in Feature 89. Eastern box turtle was noted in Features 17 and 115.

Summary of Faunal Remains

Most of the faunal remains from the Walnut site were recovered from a Middle-Late Archaic context, although Woodland and Mississippian remains are also represented. The majority of these remains are burned and calcined bone fragments, and are generally from indeterminate mammals.

The species diversity of this sample is low, but considering the poor bone preservation, it may represent a broad based hunting and gathering economy. The mammals and birds (turkey) could have been taken in the forests, along the river or on the ridges on either side of the Tombigbee River. The box turtle could have been taken in the open forests. The aquatic turtles and the two fish species could be found in small ponds, oxbow lakes, or in the nearby creeks or river. The identification of these fragments points to the regular utilization of aquatic resources. The meat staple of the diet was probably the white-tailed deer as it was throughout the eastern woodlands. This faunal sample as a whole compares well with the faunal assemblage obtained from Russell Cave (Weigel 1974). The pig remains were located in the upper 30 cm in Block D which was culturally mixed. Due to this provenience it is felt that the pig was an historic intrusion into the site's deposits.

DISCUSSION AND INTERPRETATION

Excavations at the Walnut Site (22IT539) have produced a wealth of data from which we may address pertinent research questions. The recovered materials reflect different natural and cultural processes which interact to produce the archaeological record.

The recovery strategies involved current methods and techniques which were designed to maximize the return of solid archaeological data in a form readily usable by the laboratory team. The success or failure of these strategies has not yet been determined pending detailed analyses of the data.

The preliminary laboratory analysis of recovered specimens has allowed the formulation of some working hypotheses. These may be relevant to understanding the prehistory of the Upper Tombigbee

Valley and contiguous areas. They are derived from the research orientation of the project and are grounded in a techno-environmental theory of long term relationships between man and the natural and social environments. These relationships appear to be long and varied in the Upper Tombigbee Valley based on our preliminary findings. The following discussion and inferences will serve two basic functions. The first is to synthesize the preceding sections and present an interpretive view of continuities and changes throughout prehistory at 22IT539. The second is to suggest viable research channels which may be fruitful and worthy of future study. The materials excavated from the Walnut Site represent one of the largest well controlled and documented samples of Archaic materials (primarily lithic) from anywhere in North America. It is hoped the ensuing discussions and limited interpretations are comensurate with the resource.

COMPONENTS

Determination of the number and kinds of archaelogical components at the Walnut Site was difficult. This stems from several factors including the internal nature of the site deposits, minimal previous work in this area, the preliminary stage of analysis, and the always present vagaries of archaeological classification. The components were identified by the presence of diagnostic temporal artifacts, primarily projectile point/knives and ceramics. These types have been documented to be time/stratigraphic markers in both the Upper Tombigbee Valley and elsewhere in the Southeast.

The following comparisons and discussion attempt to produce a summary of the archaeological components represented as well as the evidence to support the findings. The discussion will begin with the Archaic stage and continue through the Mississippian stage. The Archaic components will recieve in-depth evaluation and synthesis since the major occupations at the site date to this stage. Components of Gulf Formational, Woodland, and Mississippian cultures will be discussed as a second major group. The recent or modern historic component will be discussed briefly.

Archaic

Archaic components at the Walnut Site were distinguished primarily through cultural historical markers, their distributions, and C-14 determinations. Although the stratification of the site in terms of discrete cultural zones was less than ideal, generalized stratigraphic zones were present. Changes through time

in temporally sensitive artifact types indicate shifts and evolution in cultural, historical, and perhaps environmental adaptations. The following discussions are concerned with the position and frequency of Archaic projectile point/knife categories recovered from the site. Emphasis is placed on their stratigraphic association, associated C-14 dates and technological changes which are detectable through attribute analysis and distributional data. Generalized changes in hafting technology which may relate to cultural change or continuity are discussed.

Distribution of Projectile Point/Knives by Block

Block A: This 4 m by 4 m unit provides the only complete stratigraphic sequence from a particular portion of the site other than the 1 m by 2 m test units. The vertical distribution of the projectile point/knives recovered from this block is presented in Appendix I. Identifiable projectile point/knives were recovered to a depth of 1.8 m in Block A; Levels 6, 7, 12, and 13 did not contain diagnostic hafted bifaces.

The Late Woodland/Mississippian Triangulars as well as the Little Bear Creek/Flint Creek forms occur in Levels 1 through 3. Benton and Sykes-White Springs projectile point/knives occur most frequently in Levels 8 through 10 within the same stratigraphic units.

All Early-Middle Archaic forms occurred in Levels 11 through 18 and the majority of the Eva-Morrow Mountain and Cypress Creek projectile point/knives were found in Levels 14 through 16. A single Kirk Corner Notched was found in Level 18 and a Crawford Creek was recovered in Level 11.

These data suggest a generalized chronological order of projectile point/knife styles in this block although there is no clear separation of the Benton and Sykes-White Springs forms. These projectile point/knives also occur with Cypress Creek types in Level 14.

Block B: Block B contains an incomplete stratigraphic record because excavation was terminated in Level 10. The available data suggest that a similar sequence exists here as is found in the other blocks. Appendix I summarizes these data and presents computed percentages for each grouping.

The Late Woodland/Mississippi Triangulars and Little Bear Creek/Flint Creek types predominate in the upper 3 levels as they did in Blocks A and C. Bentons comprise 90 to 100 percent of the forms in Levels 5 through 7. Two Sykes-White Springs projectile point/knives were found in Level 10. Bentons continue to be pre-

sent in Levels 8 through 10, although their relative frequency declines in these levels. Because the block was reduced in size to a 4 m by 4 m unit beginning in Level 8, it is not clear if this reduction is real or a reflection of the decrease in volume excavated. A single Eva-Morrow Mountain projectile point/knife was recovered from Level 8 and Level 10. A Dalton was found out of context in Level 8 and a single example of what appears to be a lanceolate fluted projectile point/knife was recovered out of context in Level 8.

Block C: The largest sample of projectile point/knives was recovered from Block C. This block's size decreased from a 12 m by 12 m area in the upper levels to 10 m by 10 m in the lower levels.

Some vertical clustering is evident based on the 253 projectile point/knives. The Late Woodland/Mississippian, Little Bear Creek, and Flint Creek forms predominate in Level 2. Benton forms are the majority type in Levels 5 through 9 with a peak in Levels 6 through 8 where they comprise over 80 percent of the recovered forms. Sykes-White Springs projectile point/knives are most frequent in Level 13 where they comprise 76 percent of the projectile point/knives in that level. Peaks in the vertical distribution of Little Bear Creek/Flint Creek, Benton, and Sykes-White Springs forms seems evident, although there is a great deal of overlap in distribution. It is also possible that the Sykes-White Springs and Benton forms, being morphologically similar, have long temporal distributions; however, some vertical separation of styles is evident in Block C as well as a change in the use of material types through time. This will be discussed below.

The Early and Middle Archaic projectile point/knife styles (Eva-Morrow Mountain, Cypress Creek, Crawford Creek, and Kirk) were not well separated in Block C, due to mechanical removal of much of this component. The vertical excavation of this block was discontinued after several 2 m by 2 m squares in Level 13 had been completed, leaving the remaining underlying components unexcavated. During the last days on the site the block was stripped by a backhoe to the yellow polygynal soil in order to locate features. As clean-up from this operation was underway, three Big Sandys, two in situ, were removed in the same 10 cm level in the top of the polygonal soil. This may suggest that an Early Archaic component may have been stratigraphically intact in Block C.

Block D: Excavation of Block D was initiated at Level 10 and was then enlarged to a 6 m by 8 m block at Level 15. The upper meter of deposits was removed mechanically to afford large scale examination of the lower Archaic zones.

Most of the recovered projectile point/knives are from Levels 15 and 16. It is in these levels that the Middle Archaic Eva-Morrow Mountain, Crawford Creek, and Cypress Creek forms were recovered. Two Benton forms were recovered in Level 13. Sykes-White Springs projectile point/knives occur in Levels 14 through 16 and there is the suggestion that they occur stratigraphically above the Eva-Morrow Mountain and Cypress Creek forms. Crawford Creeks occur in the same level as Morrow Mountain projectile point/knives and are not stratigraphically separable from other Middle Archaic styles. It appears that the Kirk Corner Notched projectile point/knives cluster in Levels 18 through 20, although two were found out of context in Levels 15 and 16.

Summary of Distribution of Projectile Point/Knives by Block

The vertical distributions of the major projectile point/knife categories represented at the Walnut site suggest a tentative Archaic chronology. Due to incomplete stratigraphic data from three of the block excavations, the chronology must use extrapolations from different blocks. The latest intact Archaic component is the Benton which is most visible in Blocks B and C. The dominance of the Benton forms is clearly evident in Levels 5 through 10. The Sykes-White Springs forms occur with Benton types and become dominant below Level 10. Data from other blocks concerning the Sykes-White Springs and Benton relationship is not particularly helpful, although there is a tendency for the former to occur below what would have been Benton levels in Block D. There is no clear separation in Block A, however the Block B data suggest Sykes-White Springs forms are conspicuously absent in the Benton levels.

The Eva-Morrow Mountain zone lies stratigraphically below the Benton and Sykes-White Springs levels. The thick, organic zone produced several Eva-Morrow Mountain, Cypress Creek, and Crawford Creek projectile point/knives in addition to an occasional Sykes-White Springs. These data suggest that an Eva-Morrow Mountain horizon precedes the Benton and Sykes-White Springs occupations. The relationships between the Eva-Morrow Mountain, Cypress Creek, and Crawford Creek projectile point/knives is not clear. It is not known if two or three different forms were in use during Middle Archaic times at the Walnut site because they were all found in the same stratum in roughly equal percentages. There may have been mixing of cultural material from repeated occupations over a relatively short period of time. The majority of the cultural material in the Middle Archaic zone may be a result of intensive Eva-Morrow Mountain occupation(s). The Cypress Creek projectile point/knives were either deposited before the Eva-Morrow Mountain occupations and subsequently incorporated into the Middle Archaic midden or they may represent a function-

ally distinct implement. The current belief is that Crawford Creek projectile point/knives occur in Morrow Mountain tool assemblages, based on their direct association with Morrow Mountain projectile point/knives at the Stanfield-Worley bluff shelter in northwestern Alabama (DeJarnette et al 1962). These notched forms, if the association is correct, may give some support to the hypothesis that Cypress Creek projectile point/knives may be a part of the tool kit. This may not be the rule , however, because Cypress Creek projectile point/knives were not found at 22IT576 where a substantial Eva-Morrow Mountain component was present. This is discussed in Chapter 7 of this report.

Below the Eva-Morrow Mountain zone, stratigraphic evidence of Early Archaic occupation is scarce. The Kirk Corner Notched and Big Sandy projectile point/knives occurred generally at the base of the Middle Archaic zone and below it. These data suggest that the Early Archaic occupations occurred at the site and their cultural material was in correct position.

An attempt has been made to serriate the projectile point/knives recovered from Blocks A through D at 22IT539 because of the large sample size and because the strata in this portion of the site are relatively continuous and level. The other excavation units were not included in this analysis due to the absence of one or more of these factors. As explained previously each block was not completely excavated and differing volumes were removed from each arbitrary level of the site (Table 5.1). To equalize this sampling, a correction factor for each level was computed (Table 5.35). This correction factor was determined by dividing the actual number of excavated 2 by 2 m by 10 cm units into the most representative highest number of units excavated, 40. Although 49 units were excavated in Level 3, this is primarily due to Block C which was reduced in size in Level 4. For example, 37 units of Level 10 were excavated. The correction factor of 1.08 was determined for this level by dividing 37 into 40. The number of projectile point/knives in each level (Table 5.37) was then multiplied by the correction factors to determine the equalized number of specimens per level (Table 5.36). The percentages by level of both corrected and uncorrected numbers of projectile point/knives were then computed (Table 5.38).

The results indicate that 22IT539 is generally stratified throughout and that cultural components do occupy relatively discrete zones. There is overlap of these cultural zones and occasionally types are clearly out of context (example, a Dalton point in Level 4), but this is to be expected in the depositional/occupational environment. The cultural components can be generally assigned to a series of arbitrary levels; within these zones are peaks of dominance for the artifact type. The component zones are as follows:

Benton: Levels 5 - 9, peak at Level 6
Sykes-White Springs: Levels 10 - 13, peak at Level 13
Eva/Morrow Mountain: Levels 14 - 17, peak at Level 14
Kirk: Levels 18 - 20, no peak

It is evident from Tables 5.35 - 5.38 that the category "Residual Stemmed" is not a useful temporal type. This category needs further analysis to determine if temporal varieties of this type exist.

The information presented in Tables 5.36 - 5.38 can be used for seriation in furture research. The frequencies of forms up to Level 4 appear to be undisturbed. This sequence of projectile point/knives at 22IT539 can be used in future analyses of the chronology of the Upper Tombigbee Valley and the mid-South.

Carbon-14 Dating

A total of 11 radiocarbon samples were submitted for analysis from the Walnut site. Only one was from a provenience which was not strictly Archaic in terms of cultural material. Table 5.39 summarizes the radiocarbon dates. The provenience of the sample is also included. The dates are given using both the Libby and current standard half-life. The calendric dates have also been determined using the current standard half-life and the MASCA correction (Ralph et al 1973). For purposes of the discussion and intergration below, the uncorrected C-14 date using the 5730 half life is used.

All samples except one produced radiocarbon determinations of between 8,000 and 5,000 years ago. The one sample was from a mixed provenience in Block A, Level 3, which yielded a date of 2,644 B.C. The remaining dates are believed to give reasonably accurate ages for the three major occupations at the site: Eva/Morrow Mountain, Sykes-White Springs, and Benton.

By far the tightest control realized was from the Benton zone and associated features. A total of 4 dates seem to bracket the Benton occupation with the earliest from Level 7 in Block A of 3,756 B.C. and the latest at 3,383 B.C. Two dates were obtained from Block B from 2 separate strata within Feature 6 (prepared area). These two samples are within 10 years of overlapping at the one sigma level and average 3,463 B.C. A stratified Benton pit (Feature 142) dated to 3,602 B.C.

Dates were also submitted from Blocks A, C, and D. Feature 120, a probable Sykes-White Springs prepared area from Block C, dated to 4,199 B.C. (Stratum 2). The Eva/Morrow Mountain zone in Block A (Level 16) dated to 5,353 B.C. A corresponding Eva/Morrow Mountain level in Block D dated 4,292 B.C. Feature 158 in Block

D was an inhumation associated with a Sykes-White Springs point and dated to 5,518 B.C. Another inhumation nearby (Feature 149) contained no grave goods, but the charcoal from the pit fill dated to 3,859 B.C. However, there is evidence of disturbance above and within this latter pit.

It was hoped that the dates from the Eva/Morrow Moutain zone and the inhumations would come out relatively close. Two dates were very similar, those from Feature 151 and Level 16 of Block A. The other two, however, were much younger. Given the consistent age of the Benton dates from the upper zone (III), the range for the lower zone (VI) dates should be older. If one excludes the late date from Feature 149, then the average radiocarbon age of the three Middle Archaic dates would be 5,054 B.C. This fits within the approximate 1500 year span (5,500 - 4,000 B.C.) noted in the literature for the Middle Archaic stage. The date of 4199 B.C. from Feature 120 is acceptable for a late Middle Archaic occupation and would fit well with the Benton dates. The date of 3,952 B.C. from Level 12 of Block A would also seem to be accurate, given its assignment of a probable Sykes-White Springs occupation.

The Carbon-14 dates leave room for some speculation concerning the true ages of the cultural remains found. The Benton dates are entirely acceptable and gives us a well dated cultural occupation(s) spanning the last centuries of the 4th millennium B.C. The two purported Sykes-White Springs dates average about 500 years older and cluster around 4,000 B.C. The Eva/Morrow Mountain dates average around 5,054 B.C., if the date from Feature 149 is excluded. If that date is considered, then the average would be much later.

The source of the inconsistencies in the early dates appears in part to be due to disturbance from above for Feature 149, as noted. Intrusions and bioturbation were difficult to separate in the dark midden.

Archaeomagnetic Dating

Several archaeomagnetic samples were taken from the fired aggregates, especially in Feature 120 and Feature 6 which are prepared areas. As of the writing of this report, no results were available. These dates should be forthcoming in future reports of these investigations in the Upper Tombigbee Valley.

Gulf Formational, Woodland, and Mississippian Components

Segregation of the Gulf Formational, Woodland, and Mississippian components was difficult. The mixed nature of the upper levels at the Walnut site precluded the use of stratigraphic data in interpretation. Very few pit features were recovered which may have provided greater insight into the ceramic assemblages of the various components.

Ceramics were recovered mainly from three excavation blocks, A, B, and C, along with some from the test units. They were virtually confined to the upper four levels, with only scattered sherds and sherdlets present in the deeper Archaic levels due to bioturbation and other forms of disturbance. Blocks B and C contained the greatest amount of ceramic materials. The vertical distribution of the major ceramic groups recovered at the Walnut site is presented in Appendix I.

Vertical Distribution of Major Ceramic Groups by Block

The only block exhibiting stratification is Block A. Wheeler sherds are common in Levels 3 and 4 while other temper groups are confined primarily to the upper two levels. The Miller sherds (Furrs Cord Marked and Saltillo Fabric Impressed) extend into Level 4 but are generally confined to the upper three levels.

In Block B the data suggest that mixing has occurred. Grog tempered ceramics (Baytown Plain and Mulberry Creek Cord Marked) predominate in all major ceramic producing levels with the exception of eroded and residual sand tempered types.

Block C ceramic distributions offer little help in segregating components. Late Woodland and Middle Woodland types are mixed throughout, and outnumber Gulf Formational sherds in the lower ceramic producing levels.

The vertical distribution of ceramic materials at the Walnut site are not of value in determining site components, as stratigraphic or seriational analysis could not be conducted. This forced the use of additional distributional data to separate the various components.

Horizontal Distribution of Major Ceramic Groups by Block

If vertical position of the ceramic types is disregarded and type totals per block compared, there appears to be some evidence of horizontal differences in ceramic distributions at the Walnut

site. A cursory examination of these data from Blocks A, B, and C indicate apparently different Middle Woodland, Late Woodland, and possibly Mississippian ceramic distributions. No such differentiation of the Gulf Formational ceramics was detected.

Distribution of Middle Woodland Ceramic Groups Between Blocks

A comparison of the Middle Woodland ceramic types is made in Table 5.40. Between Blocks A and B there is a favorable comparison of percentages, with Furrs Cord Marked making up a slightly higher percentage in Block B. An absence of Mulberry Creek Plain, Flint River Cord Marked, and Long Branch Fabric Impressed is noted in Block A.

However, when Block C is compared with Blocks A and B, the similarity in Middle Woodland distributional frequencies diminish. A noticeable difference is observed in the distribution of the limestone and sand tempered types. Whereas in Blocks A and B limestone tempered types are virtually absent, in Block C almost 18 percent of the ceramics are limestone tempered.

The ratio of Saltillo to Furrs is relatively the same in all blocks with Saltillo out numbering Furrs by 1-3 percent. Furrs Cord Marked occurs with Saltillo Fabric Impressed in an almost 1:1 ratio in Block B, however.

Distribution of Late Woodland/Mississippian Ceramic Groups Between Blocks

A comparison of selected Late Woodland and/or Mississippian ceramic types (Table 5.41) in Blocks A and B indicate similar distributions between them. A slight difference is seen with the higher percentages of shell tempered pottery and Mulberry Creek Cord Marked in Block B.

A comparison of Blocks A and B with C indicates major differences in terms of shell tempered and grog tempered frequencies. Whereas shell tempered ceramics make up between 8-12 percent in Block A and B, they constitute over 40 percent in Block C. Also, Mulberry Creek Cord Marked outnumbers Baytown Plain by almost 3:2 in Block B, but in Block C Baytown Plain outnumbers Mulberry Creek Cord Marked by 2:1. Another marked difference is in the occurrence of decorated early Mississippian types, such as Moundville Incised, in Block C where they compose almost 2 percent of the Shell tempered ceramics. The percentage of shell-grog tempered ceramics in Block C is 12 percent compared to 3-8 percent in Blocks A and B. In addition, early Mississippian ves-

sel forms such as globular jars with strap handles occur in Block C. Thus, the spatial distributions of the Late Woodland/Mississippian ceramics seem to indicate discrepancies which may reflect differential site occupation.

Component Summaries

Archaic Stage

The vertical distributions of the major projectile point/knife categories represented at the Walnut site suggest a tentative Archaic chronology. These data suggest at least seven major Archaic components at the Walnut site: (1) Big Sandy (8,000 B.C. - 7,500 B.C.), (2) Kirk (7,500 B.C. - 6,500? B.C.), (3) Cypress Creek (6,500 B.C. 5,000? B.C.), (4) Eva/Morrow Mountain (5,500 B.C. - 4,000 B.C.), (5) Sykes-White Springs (4,500 B.C. - 3,800 B.C.), (6) Benton (3,800 B.C. - 3,000 B.C.), and (7) Terminal Archaic-Perry phase? (3,000 B.C. - 1,000 B.C.). The recovery of a single fluted specimen and two Dalton points indicates that earlier occupation could have occurred (9,000 B.C. - 8,000? B.C.).

The major contextual data from the site are restricted to Eva/Morrow Mountain, Sykes-White Springs, and Benton components. Comparisons of these components in terms of intra-site patternings and activities is the object of a following discussion.

Gulf Formational, Woodland, and Mississippian Stages

The deposits of the post-Archaic prehistoric occupations at Site 22IT539 had been disturbed so that vertical separation was not possible. Horizontal separation was evident from the location of temporal ceramic types and did indicate patterning. Two possible Middle Woodland components can be detected: one with limestone tempered vessels on the northwest section of the site (Block C) and one without limestone tempered ceramics on the south portion of the site (Blocks A and B). Two possible Late Woodland/Mississippian components can be identified. The component containing shell and grog tempered cermaics was located on the north side of the site (Block C) and the component containing primarily grog tempered ceramics was located on the southern end of the site (Blocks A and B). The Gulf Formational component appears to have utilized the entire site area relatively uniformly.

The ceramic types recovered at 22IT539 indicate that most of the post-Archaic components previously encountered in the Upper Tombigbee Valley were present here. Based on data from other

sites and earlier research in the area, these components are the Middle Miller I, Pharr Subphase (A.D. 100-400) and possibly Gainesville subphases (A.D. 900-1100); the Late Miller III, Catfish Bend Subphase (A.D. 900-1100); and the Early Mississippian (A.D. 1200-1300) (Jenkins 1982).

INTRA-SITE PATTERNING AND ACTIVITIES

The cultural and historical sequence at the Walnut Site exhibits certain patterning which is probably related to changing site use through time. With an historical sequence fairly well documented, it becomes feasible to investigate other aspects of that history.

Detailed examinations of technology and use practices must wait intensive analyses (see Ahler, Appendix III). The Phase I preliminary analysis only allows for brief statements and comparisons of these dimensions for certain site components. It is hoped that these will stimulate further research concerning the sites' position in prehistoric settlement systems which operated for thousands of years in the Upper Tombigbee Valley.

Brief comparisons of selected tool groups of the major segregable Archaic components were made. The comparisons will involve Eva/Morrow Mountain, Sykes-White Springs, and Benton tool groups. The major tool categories used in the comparisons include chipped stone, ground stone, introduced rock, and miscellaneous fired material. Code numbers which apply to tool types in the laboratory manual (Appendix IV) are given to indicate which tools are subsumed under a general category heading.

- Core - (All)
- Preform I - (All)
- Preform II - (All)
- Biface Blades - (02: 01-15, and 03: 07)
- Scrapers - (All)
- Drills - (All)
- Knives - (07: 08, 18, 19)
- Choppers - (07: 01-02, 09, 14)
- Adzes - (07: 03-04, 12, 15, 16, 17, 20, 21)
- Utilized Flakes - (09: 02, 04, 06, 07, 09, 18)
- Chipped Stone Fragments - (07: 10)
- Abraders - (08: 05, 39)
- Hammerstones - (08: 01, 04, 23)
- Anvilstones - (08: 02, 03, 31, 34, 38)
- Muller - (08: 06, 08, 26, 29)
- Mortar - (08: 07, 35, 37)
- Polished Stone - (08: 09, 11-13, 15, 27, 28, 30, 33)
- Ground Stone Fragment - (08: 17, 20-22, 24, 25)
- Sandstone - (10: 08, 09)

Fire Cracked Chert - (10: 04)
Fired Clay - (All)
Daub - (All)

Eva/Morrow Mountain Component

The Eva/Morrow Mountain zone, located in Levels 15-17 of Blocks A and D, provide a data base for a morphological, and to a lesser extent, technological analysis. Table 5.42 summarizes the major tool groups and comparative percentages of each tool category were computed for all tool types.

It should be noted that these samples of the Eva/Morrow Mountain component are not necessarily representative nor adequate; however, they represent what we have and can examine. The block comparison indicated the following trends.

Biface manufacture appears to have been an important activity. Early stage biface production, as represented by broken and aborted Preform I's, is much more frequent in Block D where they make up 24 percent of the cores, preforms, and biface blades than in Block A where they represent only 4 percent. This suggests either differing lithic reduction strategies during the Middle Archaic, or that different tasks were being performed in different areas during this occupation. The distribution of chipped stone tools overall is similar between the blocks with perhaps more diversity being represented in the Block D collection. Ground stone tool distribution is also similar, with again slightly less diversity in the Block A collection. But more hammerstones occur in Block D. The introduced rock categories are similar in distribution between the blocks as well.

The breakdown of raw materials used is similar in both blocks. There was a heavy reliance on local heated Camden chert and a conspicuous absence of exotic stone.

Benton Component

Table 5.43 compares the artifacts in Block B, Levels 6-7 and Block C, Levels 6-8. There are more Preform 2's and biface blades than Preform 1's in both groups. Biface blades make up most of the bifacial inventory with the exception of projectile point/knives. Other chipped stone tools represented included scrapers, drills, knives, choppers, adzes, utilized flakes, and unidentified chipped stone fragments. One difference noted in the comparisons was the high incidence of drills in the Block C Benton zone as opposed to Block B. There was also a high percentage of unidentified chipped stone fragments in Block C.

The ground stone tools were similar in most qualitative and quantitative aspects. Anvilstones were more frequent in Block B.

The introduced rock categories were comparable, with a slightly higher percentage of sandstone recovered in Block B and more fired clay in Block C.

These data suggest similar activities performed on different portions of the site with perhaps some activities performed more frequently in certain areas. The material frequencies used in the manufacture of chipped stone tools was similar.

Comparisons of Sykes-White Springs and Benton Tool Groups, Block C

Comparisons of the Sykes-White Springs and Benton components were made based on their position in Block C, and are presented in Table 5.44.

The chipped stone tools indicate similar lithic reduction practices and tool kit diversity. Scrapers, drills, knives, and other chipped stone tools are common in both also. Evidence for early stage and late stage biface manufacture is present although biface blades are much more common. The use of cores appears to be more frequent in the Sykes-White Springs levels. The use of local heated Camden chert is common in all levels. The incidence of Ft. Payne chert is higher in the Benton component.

The ground stone tool inventories appear to be similar; however, there is more sandstone in the Benton levels than in the Sykes-White Springs levels.

Comparisons of Eva/Morrow Mountain and Benton Tool Groups, Blocks B, C, and D

Although there are similarities in the chipped and ground stone inventories from the Eva/Morrow Mountain and Benton zones at the Walnut site, there are also distinct differences.

Table 5.45 compares the Benton "assemblage" in Block C (Levels 6-8) with the Eva/Morrow Mountain "assemblage" (Levels 15-17 of Block D).

One distinction concerns biface reduction practices and materials used in their manufacture. A heavy dependence on Ft. Payne chert during Benton times is preceded by intensive utilization of local Camden chert during Eva/Morrow Mountain times. And there is a

shift to an emphasis on late stage biface reduction and rejuvenation activities during Benton times.

Differences in other chipped stone categories are present as well. There is a higher percentage of scrapers, knives, and utilized flakes in the Eva/Morrow Mountain zone. However, drills and chipped stone fragments predominate in the Benton levels.

The ground stone tools are similar, but a higher frequency of hammerstones, consistent with the large number of Preform 1's, occurs in the Eva/Morrow Mountain zone.

Introduced rock categories are similar with both components containing high amounts of sandstone, fired clay, and fire cracked chert.

The frequency of cores is slightly higher in the Benton zone. Early stage preforms are more abundant in the Eva/Morrow Mountain zone, although all stages in biface manufacture are represented. Preform I's are less frequent in the Benton zone with late stage bifaces predominating.

The Eva/Morrow Mountain component is morphologically much more diversified than Benton. Scrapers, drills, knives, choppers, adzes, and utilized flakes are all well represented in the Eva/Morrow Mountain zone. The Benton zone is characterized by a high percentage of chipped stone fragments whereas the Eva/Morrow Mountain tool group contains one quarter as many.

The ground stone tools are similar; however, there are four anvilstones in the Benton level and none in the Eva/Morrow Mountain zone. Introduced rock inventories are similar except for slightly higher percentages of sandstone in the Benton levels.

These Benton and Eva/Morrow Mountain components suggest some general site activities ranging from tool manufacture to tool use and recycling which apparently varied through time. A variety of cutting, scraping, hammering, chopping, abrading, drilling, and pounding tasks were carried out. How these activities were related in terms of the internal structure of the settlement and the diachronic use of the site is difficult to determine without more intensive analysis.

Comparison of Benton and Sykes-White Springs "Prepared Areas"

Two prepared areas were carefully excavated at 22IT539 so that associated artifacts were plotted in situ around and on the surfaces. One of these was located in Block B (Figures 5.10 and 5.11) and dated to the Benton occupation(s) circa 3,600 - 3,300

B.C. The other was located in Block C (Figure 5.9) and probably dates to the Sykes-White Springs occupation circa 4,300 - 3,800 B.C. or slightly earlier than Benton.

Figures 5.57, 5.58, and 5.59 show the horizontal distribution of selected plotted specimens in and around the large Sykes-White Springs "prepared area" in Block C (Feature 120). The separate distributional maps indicate the vertical and horizontal distribution of the tools. The center of the "prepared area" contained a complex of fired aggregates with a mound appearance (Figure 5.11). The artifact distributions show that the "prepared area" was mostly devoid of cultural debris with a heavy concentration on the western perimeter. The majority of associated tools are unidentified chipped stone fragments and projectile point/knives, both intact and fragmented.

The Benton "prepared area" (Feature 6 in Block B) was excavated in a similar manner as Feature 120 and horizontal position. Selected plotted specimens are shown in Figures 5.60 - 5.63 by 5 cm sublevel. The spatial relationship of the artifacts to the "prepared area" is clearly shown. The majority of these were unidentified chipped stone fragments and projectile point/knife fragments. Benton points were the primary intact chipped stone tools associated. These data suggest that numerous activities took place on and around these areas. The horizontal distribution of the tools with regard to the central "prepared area" does not clearly reflect any specific activity loci. There appears to be a concentration of artifacts to the east and south of the area; however, material was present in other directions. Most artifacts were recovered peripheral to the "prepared area" proper, suggesting repeated "clean-up" activities which may in part account for the relative paucity of tools directly associated in the "prepared area."

The two "prepared areas" are very similar in configuration and associated artifact types. The features appear to have been centers for multiple activities during occupation of the site in Benton and Sykes-White Springs times.

Integration of Components

The majority of the evidence which relates to intra-site patterning and activities is associated with the Eva/Morrow Mountain, Sykes-White Springs, and Benton ocupations. These will be discussed in the most detail. Other occupations are discussed very generally due to the mixed and ephemeral nature of the occupations.

The early Archaic period was represented at the Walnut site based on the apparent in situ recovery of Big Sandy and Kirk Corner Notched hafted bifaces in the upper portion of the polygonal soil (Zone VII). Due to the apparent diffuse nature of the occupations, as well as intensive Middle Archaic utilization of the site, no clear separation of the early Archaic component was made. No intra-site patterning was detected. The activities carried out at the site probably included some stages of biface manufacture, tool maintenance, and rejuvenation. This is inferred primarily from a similar occupation at the Poplar site (22IT576, Chapter 7) where Kirk materials were recovered separated from above Middle Archaic components. These data indicate that the early Archaic occupations at the Walnut site were probably made by small groups on a seasonal basis. It was probably a specialized extractive camp during the time period from 8,000 - 6,500 B.C.

A component tentatively defined as "Cypress Creek" is recognized based on a distinctive corner notched hafted biface. Interpretations of intra-site patterning and activities of this group are speculative. There is the possiblility that these hafted bifaces could belong with the Eva/Morrow Mountain occupation. However, as discussed earlier, it is believed that they pre-date this occupation and are considered to be either a Late Early Archaic or Early Middle Archaic form from 6,500 - 5,500 B.C.

The Eva/Morrow Mountain occupation of the site was a substantial settlement. The term Eva/Morrow Mountain is used here to reflect the regional tradition with which this occupation is closely related. Most of the hafted bifaces would be typed as Morrow Mountain. The term Eva/Morrow Mountain is used to reflect the closer western Tennessee Valley cultural tradition as represented at the Eva site (Lewis and Lewis 1961). The Eva/Morrow Mountain "culture" is thought to date between 5,500 and 4,000 B.C. based on published data and from the data gathered from the current investigations. The following summarizes what patterning and activities may be gleaned from the current study.

It has been inferred in previous discussions that the "prepared areas" represented focal points of activity. These areas first appear in the Eva/Morrow Mountain levels of Block D at the Walnut site. Although they are less well defined and perhaps somewhat smaller in size than the later Sykes-White Springs and Benton areas, they nonetheless indicate that activities were performed on and around their surfaces. Specific tasks which were performed included the procurement and reduction of local Camden chert cobbles into finished tools. This process evidently involved heating the chert as a step in biface manufacture. Specific methods of reducing the local Camden gravels include reducing whole cobbles via hard hammer and soft hammer percussion

as well as producing flake blanks from the cobble cores. These were then heated and further reduced by soft hammer percussion. The majority of the preform 2's, biface blades, and projectile point/knives are heated. Most preform 1's are unheated. Cores are both heated and unheated, with many core tools such as unifacial and bifacial choppers being unheated.

One of the most distinguishing aspects of the Eva/Morrow Mountain "assemblage" is the ubiquity of flake tools such as hafted end scrapers and side scrapers. The variety of flake tools included several kinds of scrapers on flakes. Flake blanks were generally expanding to amorphous in form; however, some were blade-like. A variety of other chipped and ground stone tools was also found.

Another important aspect of the Eva/Morrow Mountain occupation(s) was the apparent presence of two cemeteries. These were located on separate areas of the site indicating a substantial occupation during this time period. The lay-out and arrangement of the cemeteries suggest a community plan which involves the segregation of secular and ritualistic activities. The prepared area in Block D (Feature 128) may have been the focal point of domestic activity when the cemetery in Block D was in use. The large amounts of fired aggregates, burned sandstone, charcoal, fire cracked chert, and a diversified tool kit suggest a substantial occupation. The dark organic Zone VI attests to this. It should be remembered that chronological and cultural association of the cemeteries is not firm. Association with the Eva/Morrow Mountain component is our best determination. The 5518±85 B.C. date from Burial 11 agrees with this assignment. However, a Sykes-White Springs projectile point/knife was also associated with this burial.

The tool assemblage suggests that a variety of extractive and maintenance tasks were carried out on the site, probably in association with the "prepared areas." Such tasks seem to have involved hunting, fishing, and turtling as well as processing the material from these outings. Evidence for tool manufacture and use is present with a full complement of implements present. When this evidence is coupled with the presence of cemeteries, it indicates that the Walnut site was a multiple activity locus during Middle Archaic times. It suggests strongly that the site was used as a permanent or semi-permanent base camp during this time period. The primary season of habitation may have been during the summer and fall if the location of the site in the floodplain had any bearing. This is consistent with the large amounts of hickory nut recovered (even though these are storable) and the aquatic resources taken such as fish and turtle.

The use of the "prepared areas" as focal points of activity continues during the succeeding Sykes-White Springs occupation. The large "prepared area", Feature 120, contained numerous fired ag-

gregates or "hearths" suggesting repeated usage. As in the Eva/Morrow Mountain zone, there is an indication of multiple tasks carried out on the site; however, the incidence of early stage biface manufacture is diminished somewhat. The relatively large amount of bone recovered in Block C, apparently is association with the large "prepared area" may suggest that the occupation was semi-permanent during the summer through fall months. This is only speculation and more sensitive seasonal indicators along with better contexts are needed to determine this. Two inhumations were recovered in Block C in the immediate vicinity of the prepared area. The level of origin of these interments, however, is not clear due to the preservational characteristics of the site's sediments. It is not known if the conspicuous absence of inhumations within the Sykes-White Springs zone is related to cultural or natural processes. The latter is favored due to the extreme acidic nature of the earth. In short, evidence for a semi-permanent or permanent occupation(s) during Sykes-White Springs times is evident. The presence of large "prepared areas" and a diversified tool kit suggest a base camp utilization for the Walnut locale during this time period. It appears that between 4,500 and 3,800 B.C. the Sykes-White Springs component evolved technologically into the Benton. The similarities are strong between these components indicating that the Sykes-White Springs and Benton are genetically linked.

The Benton component(s) at the site afforded the best inferences concerning site patterning, subsistence, technology, and overall cultural placement. This occupation dates from 3,800 - 3,000 B.C. The data support the contention that the "prepared area" in Block B represents a focal point of Benton activity. Chemical and physical analysis support the idea that humans introduced sediments to construct the prepared areas. The distribution of tools on and around the prepared area indicate that activities such as tool manufacture and rejuvenation took place. Processing of animals and plants also appears to have been undertaken. Although faunal remains were virtually absent, this is thought to be more a function of preservation than cultural practices. The predominance of charred hickory nutshell and wood charcoal along with the fired aggregates suggests that burning was common, probably related to food processing. The ubiquity of the Benton projectile point/knife form and the numerous fragments manufacture from Ft. Payne chert indicate intensive rejuvenation activity. Ahler (Appendix III) is inconclusive as to the function of Benton points; however, he indicates that a multi-purpose use is likely. Since the remaining lithic assemblage is somewhat limited when compared to the earlier Eva/Morrow Mountain "assemblage," this may suggest that the Benton point is a generalized tool suitable for multiple tasks. When this observation is combined with the use of exotic stone in the manufacture of this implement, it may suggest a low diversity tool assemblage designed to exploit a restricted environmental zone.

Benton habitation at the Walnut site was intense, but it is currently not known what this intensity was related to. It could be the "prepared areas" were protected by some type of structure, however, evidence for such is lacking. No posthole pattern or even individual postholes were recognized which could definitely be associated with the area. This does not preclude the possibility of wind breaks or other lightweight structures covering the prepared floors.

Evidence for inhumation was also lacking for the Benton components. This is believed to be due to the preservational characteristics of the soil, but may indicate a habitation of restricted duration.

It is hypothesized that the Benton occupation(s) at the Walnut site represents a base camp habitation of a seasonal nature. A summer-fall occupation is probable based on the location of the site in the floodplain.

There is a distinct possibility that an occassional Ledbetter-Pickwick occupation occurred from 3,000 - 1,500 B.C.; however, no inferences concerning activities or patterning is forwarded. The terminal Archaic occupation at the site (Perry phase) was represented in a mixed upper horizon along with Gulf Formational and Woodland sherds. Little may be inferred from this occupation except that there appears to have been a major shift in technology as noted earlier. This involves the use of local heated Camden chert in the manufacture of projectile point/knives and other tools. It appears that the site was less intensively occupied during the Perry phase, dating roughly from 1,500 - 1,000 B.C., than in preceding Archaic occupations. It may have been a special activity locale during this time period or a semi-permanent camp.

The Gulf Formational, Woodland, and Mississippian occupations are represented in the upper most portion of the site and were mixed. Little may be inferred from an assemblage point of view, although there appears to have been a continued use of local materials in chipped stone tool manufacture. It is likely that the site was used as a seasonal, specialized extraction camp during all three of the occupation components.

DIRECTIONS FOR FUTURE RESEARCH

The current analysis has allowed the formulation of a tentative site culture history and some integration of the data. However, this large sample of materials remains virtually untapped in terms of research potential.

Major problems exist in analysis from stylistic to functional elements. The large sample of projectile point/knives which date to the Middle and Late Archaic periods should prove adequate for detailed stylistic analyses. Quantitative and formal analysis approaches using existing data could potentially refine the historic sequence, establish varieties, and contribute to our understanding of the prehistoric sequence in the Upper Tombigbee Valley and contiguous areas.

From a technological viewpoint, the large volume of debitage and modified stone tools is amenable to diachronic studies in lithic technology. The addition of replicative experiments to produce groups of debitage for comparison with existing archaeological samples should be rewarding. The biface reduction sequence models could be refined using quantitative methods. Trends in biface reduction have been detected. However, interpretation of the reduction sequence is complicated by such factors as the use of different sources of raw materials in biface reduction, specifically Ft. Payne and local Camden chert.

Determining the function of the stone tools with regard to stylistic and technological elements is virtually wide open. This will require time consuming approaches such as microscopic analysis. Comparisons of tool groups from functional perspective should take into account and control for simultaneously the technological and stylistic elements as well as various use phases in the life history of the artifact (Ahler, Appendix III).

One interesting course of research would be determination of the method of manufacture, life cycle, and various uses of the Benton point. They are apparently the product of a refined core and blade industry, and are extensively recycled. Conservation of material appears to be a major factor in the resharpening practices. Multiple uses are suggested by Ahler (Appendix III) for these artifacts. It has been suggested that the different haft element lengths of Benton points vary inversely with the overall lengths. That is to say the shorter the haft element the longer the point and vice versa. Preliminary studies indicate that no such correlation exists in the Benton sample from 22IT539. This suggests the differences are historically and perhaps technologically, but not functionally related.

The present analysis has set up major analytic categories and provided a large, detailed data base from which meaningful statistical samples can be drawn. Future research may profit by studying the Middle to Late Archaic cultural remains described here and relating them to other sites in the Upper Tombigbee Valley and contiguous areas.

Table 5.1. Site 22IT539: 2 m by 2 m Units Excavated Per Level Per Block.

Level	Block A	Block B	Block C	Block D
1	4	12	10	
2	4	11	23	
3	4	11	34	
4	4	11	25	
5	4	11	25	
6	4	11	25	
7	4	11	25	
8	4	11	25	
9	4	4	25	
10	4	4	25	4
11	4		25	4
12	4		25	4
13	4		14	4
14	4			4
15	4			12
16	4			12
17	4			12
18	4			12
19	4			12
20	4			8
21	4			2
22	4			
23	4			
24	4			
25	4			

Table 5.2. Site 22IT539: Classification of Soils from the Site and Vicinity.

Soil Series	Classification
Kirkville	coarse-loamy, siliceous, thermic Fluvaquentic Dystrochrepts
Mantachie	fine-loamy, siliceous, acid, thermic Aeric Fluvaquents
Mathiston	fine-silty, siliceous, acid, thermic Aeric Fluvaquents
Ora	fine-loamy, siliceous, thermic Typic Fraguidults
Savannah	fine-loamy, siliceous, thermic Typic Fraguidults
Smithdale	fine-loamy, siliceous, thermic Typic Paleudults

Table 5.3. Site 22IT539: Munsell Color of Selected Horizons of Representative Soils in Floodplain Adjacent to the Site.

Location	Depth	Color
Terrace above Fldpl.	15-30	Yellowish brown (10YR 5/4)
East of Site	30-63	Brownish yellow (10YR6/6)
Middle of Floodplain	0-30	Brown (10YR 5/3)
East of Site	50-75	Gray (10YR 6/1)
	75-105	Gray (10YR 6/1)
Floodplain 57 m	30-60	Light brownish gray (10YR 6/2)
East of Site	75-100	Light gray (10YR 7/2)
Floodplain 20 m	25-50	Brown (10YR 5/3)
East of Site	85-125	Gray (10YR 6/1)
Floodplain 75 m	5-30	Dark gray (10YR 4/1)
West of Site	62-88	Grayish brown (10YR 5/2)
Floodplain 120 m	15-37	Dark brown (10YR 4/3)
West of Site	40-50	Dark yellowish brown (10YR 4/4)
Floodplain 40 m	25-50	Gray (10YR 5/1)
South of Site	55-85	Dark gray (10YR 4/1)
	90-125	Gray (10YR 5/1)
Floodplain 100 m	5-37	Grayish brown (10YR 5/2)
South of Site	100-125	Gray (10YR 5/1)
Floodplain 75 m	15-37	Gray (10YR 6/1)
North of Site	87-112	Light Gray (10YR 7/1)

Table 5.4. Site 22IT539: Particle Size Analyses and pH of Soils Adjacent to Site.

Sample Location, with respect to the site	Depth in cm	Sand* %	Silt %	Clay %	Texture**	pH
Terrace to the East	15-30	68.0	14.7	17.3	SL	4.9
Bordering the Fldpl***	45-63	62.8	12.6	24.6	SCL	4.8
Middle of Fldpl, East	0-30	25.8	43.2	31.0	CL	4.8
Middle of Fldpl, East	50-75	30.7	39.7	29.6	CL	4.4
Middle of Fldpl, East	75-105	36.4	33.3	30.3	CL	4.8
In Fldpl, 75 m East	30-60	28.2	42.9	28.9	CL	4.8
In Fldpl, 75 m East	75-100	35.2	40.0	24.8	L	4.7
In Fldpl, 20 m East	25-50	43.0	32.5	24.5	L	4.7
In Fldpl, 20 m East	85-125	47.1	23.2	29.7	SCL	4.7
In Fldpl, 75 m West	5-30	40.7	36.2	23.1	L	5.0
In Fldpl, 75 m West	62-88	39.7	36.3	24.0	L	4.8
In Fldpl, 120 m West	15-37	50.4	29.0	20.6	L	4.8
In Fldpl, 120 m West	40-50	78.9	13.0	8.1	LS	4.8
In Fldpl, 40 m South	25-50	65.5	20.3	14.2	SL	5.0
In Fldpl, 40 m South	55-85	63.6	23.4	13.0	SL	5.3
In Fldpl, 40 m South	90-125	80.7	12.5	6.8	LS	4.5
In Fldpl, 40 m South	5-37	16.6	46.9	36.5	SiCL	4.9
In Fldpl, 40 m South	100-125	14.5	50.2	35.3	SiCL	4.4
In Fldpl, 75 m North	15-37	34.9	40.5	24.6	L	4.9
In Fldpl, 75 m North	87-112	42.3	35.7	22.0	L	4.7

* Sand = 2-0.5 mm; Silt = 0.05-0.002 mm; Clay = §0.002 mm

** L = loam; SL = sandy loam; SCL = sandy clay loam; LS = loamy sand; CL = clay loam; SiCL = silty clay loam

*** Fldpl = Floodplain

Table 5.5. Site 22IT539: Pedon Description of Representative Profile.

Depth (cm)	Description (moist colors)
0-15	Reddish brown (5YR 4/4) sandy loam; moderate fine and medium granular structure; slightly firm in place, very friable when disturbed; many fine and medium roots; few small black (10YR 2/0) charcoal fragments; greasy when rubbed; medium acid; gradual wavy boundary.
15-37	Dark reddish brown (5YR 3/3) sandy loam; moderate fine granular structure; friable; many fine and common medium roots; few small charcoal fragments; numerous krotovina and worm casts; common small and medium gray (10YR 3/1) and dark gray (10YR 4/1) potsherd; greasy when rubbed; medium acid; gradual wavy boundary.
37-60	Dark reddish brown (5YR 3/3) loam; weak fine granular structure; friable when disturbed; common fine and few medium roots; few small charcoal fragments; numerous krotovina and worm casts; greasy when rubbed; strongly acid; clear smooth boundary.
60-100	Dark reddish brown (5YR 3/2) sandy loam with few medium faint very dark brown (10YR 2/2) mottles; weak fine granular structure; friable when disturbed; occasional laminae of strong brown (7.5YR 5/8) loam in lower part of horizon; occasional mottled dusky red (2.5YR 3/2), reddish brown (2.5YR 4/4), and yellowish red (5YR 5/8) "fired aggregates"; common charcoal fragments; few fine roots; sand stripping evident on ped faces; numerous krotovina and worm casts; medium acid; gradual wavy boundary.
100-150	Dark reddish brown (5YR 2.5/2) sandy loam with few pockets of strong brown (7.5YR 5.8) loamy sand; weak fine granular structure; friable when disturbed; many charcoal fragments and few "fire aggregates"; few black concretions in lower part of horizon; few fine roots; strongly acid; clear smooth boundary.
150-180	Dark reddish brown (5YR 3/2) and strong brown (7.5YR 5/6) sandy loam; weak fine granular structure; friable when disturbed; few charcoal fragments; sand stripping on vertical ped faces; few "fired aggregates"; strongly acid; gradual wavy boundary.

Table 5.5. Site 22IT539: Pedon Description of Representative Profile (cont.).

Depth (cm)	Description (moist colors)
180-195	Dark yellowish brown (10YR 4/4) sandy loam with common medium strong brown (7.5YR 4/6) and yellowish red (5YR 5/8) mottles; weak coarse prismatic parting to weak fine subangular blocky structure; firm; vertical seams filled with very pale brown (10YR 7/4) fine sand and silt form polygonal structure, sand stripping has occurred in seams; common fine rounded black concretions; purple stains extend vertically along ped faces in upper part of horizon; strongly acid; gradual smooth boundary.
195-250	Brownish yellow (10YR 6/6) sandy loam with common medium dark yellowish brown (10YR 4/4), strong brown (7.5YR 4/6) and yellowish red (5YR 5/8) mottles; massive parting to weak coarse prismatic structure; slightly firm in place; polygonal seams filled with very pale brown fine sand and silt stripped of clay; common black round concretions; medium acid; gradual diffuse boundary.
250-275	Mottled yellowish brown (10YR 5/8), dark yellowish brown (10YR 4/4), strong brown (7.5YR 5/8), and pale brown (10YR 6/3) sandy loam; massive; slightly firm in place, friable when disturbed; few black ferromanganese concretions; strongly acid.

Table 5.6. Site 22IT539: Particle Size Distribution of Selected Soil Samples.

Depth cm	Sand 2-0.05 mm %	Silt 0.05-0.002 mm %	Clay §0.002 mm %	Texture
0-15	53.00	42.08	4.92	Sandy loam
15-37	53.64	36.88	9.48	Sandy loam
37-60	50.10	39.69	10.21	Loam
60-100	56.17	31.10	12.73	Sandy loam
100-150	55.92	30.29	13.79	Sandy loam
150-180	55.65	25.84	14.51	Sandy loam
180-195	71.34	21.11	7.55	Sandy loam
195-250	69.88	20.45	9.67	Sandy loam
250-275	64.76	23.67	11.57	Sandy loam

Sand Fraction

Depth cm	Very Coarse 2-1 mm %	Coarse 1-0.5 mm %	Medium 0.5-0.25 mm %	Fine 0.25-0.10 mm %	Very Fine 0.10-0.05 mm %
0-15	0.09	0.52	3.19	33.81	15.40
15-37	0.07	0.17	2.32	33.54	17.54
37-60	0.05	0.24	1.86	34.55	13.39
60-100	0.09	0.21	3.52	37.75	14.60
100-150	0.02	0.10	4.36	37.52	13.91
150-180	0.02	0.06	2.95	39.09	17.51
180-195	0.01	0.01	3.72	49.72	17.87
195-250	0.00	0.01	2.37	46.93	20.57
250-275	0.00	0.01	2.67	43.72	18.36

Table 5.7. Site 22IT539: Organic Matter, Free Iron Oxide, Total and Organic Phosphorus of Representative Pedon.

Depth cm	Organic Matter %	Fe2O3 %	Total P ppm	Organic P ppm
0-15	2.75	1.3	509	194
15-37	0.73	1.8	422	-
37-60	0.96	1.3	574	-
60-100	1.38	1.2	563	-
100-150	1.03	1.4	702	-
150-180	0.46	1.2	667	-
180-195	0.09	0.7	327	-
195-250	0.06	0.8	336	-
250-275	0.08	1.3	535	-

\- = Not detected by analytical methods used.

Table 5.8. Site 22IT539: pH, Exchangeable Aluminum, and Extractable Acidity of Representative Pedon.

Depth (cm)	pH	Exchangeable Aluminum*	Acidity*
0-15	5.9	0.04	9.85
15-37	5.8	0.06	6.79
37-60	5.5	0.34	8.12
60-100	5.6	0.22	10.02
100-150	5.5	0.84	10.16
150-180	5.5	0.81	7.98
180-195	5.5	0.57	3.15
195-250	5.6	0.62	3.01
250-275	5.2	1.46	4.91

*Exchangeable Aluminum and Acidity are measured in milliequivalents/100 g soil.

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Ceramic Clusters	25	B	2	2	0.35	0.46	0.06	Mid. Wood. (Miller II)
	26	B	2	2	0.11	0.22	0.04	Mississippian
Chipped Stone Clusters	99	C	8	8	0.13	0.16	0.06	Int. Lt. Arch. (Benton)
Botanical Clusters	74	C	7	5	0.22	0.25	0.10	Int. Lt. Arch. (Benton)
	94	A	15	14	0.21	0.19	0.09	Mid. Lt. Archaic
	127	D	14	?	0.40	0.31	0.05	Mid. Lt. Archaic
	130	D	14	14	0.28	0.29	0.12	Mid. Lt. Archaic
Complex Clusters	10	A	7	6	0.16	0.19	0.12	Int. Lt. Arch. (Benton)
	36	C	3	3	0.12	0.11	0.09	Natural
Fired (Oxidized) Aggregates	7	A	3	3	0.61	0.71	0.06	Mid. Gulf Form. (Wheeler)
	23	A	7	7	0.09	0.20	0.05	Int. Lt. Arch. (Benton)
	95	A	13	13	1.09	0.61	0.22	Lt. Mid. Arch. (Sykes-White Springs)
	98	C	8	8	1.10	1.35	0.09	Int. Lt. Arch. (Benton)
	108	A	17	17	0.25	0.15	0.14	Mid. Arch. (Eva/M. Mt.)
	110	C	7	6	1.00	0.81	0.11	Int. Lt. Arch. (Benton)
	111	C	8	8	1.11	1.14	0.25	Int. Lt. Arch. (Benton)
	113	C	10	9	0.52	0.35	0.08	Lt. Mid./Int. Lt. Arch. (Benton/S-W Sp.)
	118	C	8	8	0.58	0.40	0.07	Int. Lt. Arch. (Benton)
	119	C	9	9	0.51	0.48	0.19	Int. Lt. Arch. (Benton)
	121	C	10	10	0.86	0.73	0.05	Lt. Mid. Arch. (Sykes-White Springs)

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Fired (Oxidized) Aggregates	135	D	14	14	0.57	0.17	0.10	Lt. Mid. Arch. (Sykes-White Springs)
	136	D	16	16	0.30	0.74	0.14	Mid. Arch. (Eva/M. Mt.)
Hearths	117	C	?	?	0.40	0.26	0.16	Lt. Mid. Arch. (Sykes-White Springs)
	137	D	17	17	0.84	0.84	0.15	Mid. Arch. (Eva/M. Mt.)
Pits	4	B	3	3 ?	0.85	1.30	0.34	Lt. Wood. (Miller III)
	5	A	2	2	1.00	0.95	0.52	Natural
	8	A	6	6	0.11	0.12	0.11	Indeterminate
	9	B	5	?	0.86	1.22	0.15	Int. Lt. Arch. (Benton)
	12	A	6	5	0.24	0.13	0.18	Int. Lt. Arch. (Benton)
	13	A	7	7	0.52	0.40	0.27	Natural
	15	A	7	7	0.51	0.55	0.21	Indeterminate
	16	B	7-1	6-1	0.27	0.23	0.75+	Natural
	18	A	8	8	0.13	0.09	0.20	Indeterminate
	19	A	8	8	0.11	0.18	0.14	Indeterminate
	20	A	8	5	0.08	0.06	0.23	Indeterminate
	21	A	8	8	0.40	0.27	0.07	Indeterminate
	22	A	7	7	0.69	0.44	0.19	Indeterminate
	29	B	2	2	0.34	0.41	0.30	Lt. Wood. (Miller III)
	32	C	3	2	0.29	0.69	0.61	Natural
	37	C	?	?	1.00	0.97	0.77	Gulf Formational (?)
	41	C	4	?	0.37	0.52	0.88	Natural
	42	C	4	4	0.61	0.27	1.03	Natural
	43	C	4	4	0.17	0.29	0.52	Natural
	44	C	4	4	0.15	0.16	0.11	Natural

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Pits	45	C	5	4	0.25	0.23	0.51	Natural
	46	C	5	5	0.41	0.51	0.16	Natural
	47	B	6-1	6-1	0.22	0.30	0.13	Indeterminate
	48	C	5	5	0.22	0.22	0.35	Natural
	49	C	5	4	0.82	1.09	0.24	Mid. Lt. Wood. (Miller II-III)
	50	C	5	5	0.09	0.09	0.07	Indeterminate
	51	C	5	4	0.25	0.20	0.44	Natural
	52	B	6-2	?	0.10	0.14	0.40+	Natural
	53	B	6-2	?	0.20	0.22	0.40+	Natural
	54	C	5	5	0.13	0.07	0.05	Indeterminate
	55	C	5	5	0.09	0.09	0.05	Indeterminate
	56	B	6-1	?	0.09	0.09	0.04	Natural
	57	C	5	5	0.16	0.15	0.26	Indeterminate
	58	B	5	5	0.26	0.11	0.07	Indeterminate
	59	B	7-2	6-1	0.37	0.30	0.16	Indeterminate
	60	B	?	?	0.19	0.14	0.07	Natural
	61	B	7-1	4	0.43	0.29	0.37	Natural
	62	C	6	6	0.47	0.65	1.10	Natural
	64	C	5	5	0.18	0.21	0.34	Natural
	65	C	6	5	0.10	0.26	0.25	Natural
	66	B	7-2	6-1	0.20	0.26	0.12	Indeterminate
	67	A	7	7	0.26	0.40	0.11	Indeterminate
	68	A	8	8	0.33	0.28	0.08	Indeterminate
	69	A	8	8	0.26	0.27	0.19	Indeterminate
	70	B	7-2	7-2	0.22	0.27	0.35	Indeterminate

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Pits	71	B	7-1	6-2	0.14	0.33	0.43	Natural
	72	B	7-2	7-1	0.40	0.33	0.25	Indeterminate
	75	C	6	6	0.17	0.20	0.80	Natural
	76	C	6	4	0.54	0.40	0.08	Indeterminate
	77	C	6	3	0.35	0.76	0.14	Indeterminate
	78	C	6	6	0.33	0.33	0.93	Natural
	79	A	9	9	0.20	0.23	0.07	Lt. Mid. Arch. (Sykes-White Springs)
	80	A	9	9	0.77	0.68	0.19	Natural
	81	A	?	?	0.43	0.43	0.14	Lt. Mid. Arch. (Sykes-White Springs)
	82	C	6	6	0.50	0.66	0.18	Int. Lt. Arch. (Benton)
	83	C	6	6	0.34	0.34	0.30	Indeterminate
	84	C	7	7	0.34	0.65	0.65	Natural
	85	A	?	?	0.20	0.39	0.15	Indeterminate
	86	C	7	6	0.17	0.18	0.15	Natural
	87	C	7	6	0.15	0.15	0.17	Natural
	88	C	7	7	0.45	0.58	0.34	Indeterminate
	89	TP	11	11	0.71	0.43	0.50	Middle Archaic
	90		16	16	0.49	0.26	0.07	Middle Archaic
	91	TP			0.50	0.47	0.22	Indeterminate
	92		12	12	0.75	0.32	0.48	Middle Archaic
	93	A	14	14	0.33	0.40	0.34	Middle Archaic
	96	A	15	14	0.24	0.22	0.07	Middle Archaic
	97	C	8	7	1.03	0.68	0.15	Int. Lt. Arch. (Benton)
	100	A	16	16	0.24	0.17	0.12	Middle Archaic
	101	A	17	17	0.36	0.27	0.17	Early-Middle Archaic

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Pits	102	C	9	9	0.63	0.57	0.50	Natural
	103	A	18	18	0.35	0.28	0.16	Middle Archaic
	104	A	18	18	0.57	0.60	0.27	Middle Archaic
	105	A	17	17	0.35	0.21	0.11	Middle Archaic
	106	A	17	17	0.47	0.52	0.14	Indeterminate
	112	D	13	13	0.40	0.26	0.10	Indeterminate
	116	A	18	18	0.29	0.27	0.23	Natural
	138	D	17	15	0.22	0.24	0.06	Middle Archaic
	139	D	17	16	0.24	0.26	0.09	Middle Archaic
	140	D	16	15	0.28	0.16	0.08	Middle Archaic
	141	D	16	12 ?	0.13	0.22	0.11+	Middle Archaic
	142	D	17	17	1.33	1.38	0.93	Int. Lt. Arch. (Benton)
	143	TR4			0.60	0.84	0.22	Middle Archaic
	145	D	18	18	0.62	0.58	0.31	Middle Archaic
	154	C			1.96	1.26	0.98	Archaic
	155	C			1.05	1.99	0.16	Archaic
	156	C			1.45	1.05	0.42	Archaic
	157	C			1.07	2.00	0.37	Archaic
	161	C			1.03	1.12	0.26	Archaic
	166	B	2	2	1.05	0.75	0.15	Mississippian
Prepared Areas	6	B	4	4	1.78	3.43	0.35	Int. Lt. Arch. (Benton)
	73	A	8	7	3.23	2.26	0.35	Lt. Mid./Int. Lt. Arch. (Benton/S-W Sp.)
	115	C	11	11	?	?	?	Middle Archic (Sykes-White Springs)
	120	C	9	9	5.08	6.39	0.34	Middle Archic (Sykes-White Springs)
	128	D	15	15	2.80	2.11	0.73	Mid. Arch. (Eva/M. Mt.)

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Prepared Areas	129	D	15	15	1.80	2.50	0.16	Mid. Arch. (Eva/M. Mt.)
	131	D	15	15	1.48	1.03	0.25	Mid. Arch. (Eva/M. Mt.)
	132	D	15	15	1.31	1.49	0.27	Mid. Arch. (Eva/M. Mt.)
Inhumations	Bu1	A	20	18	2.01	0.96	0.70	Mid. Arch. (Eva/M. Mt.)
	Bu2	A	20	18	2.01	0.96	0.70	Mid. Arch. (Eva/M. Mt.)
	Bu3	A	20	20	0.74	0.29	?	Mid. Arch. (Eva/M. Mt.)
	Bu4	A	21	21	1.63	0.48	0.35	Mid. Arch. (Eva/M. Mt.)
	Bu5	A	20	18	2.01	0.96	0.70	Mid. Arch. (Eva/M. Mt.)
	Bu7	C	14	13	0.47	0.61	0.11	Middle Archaic (Sykes-White Springs)
	Bu8	A	20	20	0.44	0.41	?	Mid. Arch. (Eva/M. Mt.)
	Bu9	D	19	19	1.30	0.48	0.42	Mid. Arch. (Eva/M. Mt.)
	Bu10	D	?	?	1.93	0.91	0.62	Mid. Arch. (Eva/M. Mt.)
	Bu11	D	20	19	1.48	0.59	0.66	Mid. Arch. (Eva/M. Mt.)
	Bu12	D	19	19	1.56	0.76	0.63	Mid. Arch. (Eva/M. Mt.)
	Bu13	D	?	?	1.49	0.41	0.25	Mid. Arch. (Eva/M. Mt.)
	Bu14	D	19	18	1.41	0.50	0.62	Archaic ?
	Bu15	TR2	?	?	?	?	0.68 ?	Archaic ?
	Bu16	TR2	?	?	?	?	0.68 ?	Mid. Arch. (Eva/M. Mt.)
	Bu17	D	18	18	1.05	0.56	0.14	Late Middle Archic (Sykes-White Springs)
	Bu18	C	12	12	0.22	0.48	0.17	
Cremations	Bu19; 134	D	16	16	0.68	0.52	0.16	Mid. Arch. (Eva/M. Mt.)
Historic Intrusions	17	C	2	2	1.25	0.60	0.03	Modern
	27	C	3	Surf.	0.81	0.51	0.28	Modern
	23	C	3	2	4.64	0.38	0.12	Modern

Feature Type	Feature Number	Block	Level Defined	Level Origin	Length	Width	Depth	Cultural Affiliation Comments
Historic Intrusions	33	C	3	2	3.75	0.25	0.11	Modern
	34	C	3	2	1.27	0.40	0.22	Modern
Stains	14	A	7	7	0.88	0.65	0.11	Indeterminate

Table 5.10. Site 22IT539: Particle Size Distribution of Fired Aggregates and Other Selected Samples.

Sample	Sand Fraction VC	C	M	F	VF	Sand Total	Silt	Clay
F 5292	7.30	6.0	5.8	25.5	9.6	54.2	36.2	9.6
NF 5016	0.[illegible]	0.1	5.3	44.0	9.5	59.0	28.3	12.7
F 505	0.20	0.3	10.3	37.7	7.7	56.2	30.7	13.1
NF 1669	0.00	0.1	18.9	40.1	7.2	66.4	26.4	7.2
F 4987	0.80	1.4	5.7	41.6	11.9	61.4	28.6	10.0
NF 3429	0.10	0.1	0.6	41.4	9.8	51.9	37.8	10.3
F 2033	0.70	1.3	0.7	39.4	9.0	51.1	33.0	15.9
F 3113	0.04	0.7	1.9	11.7	13.3	27.7	56.8	15.5
NF 2535	0.00	0.1	11.7	44.3	9.4	65.5	28.1	6.4
R 3168	0.03	0.1	2.2	34.2	19.5	56.0	32.9	11.1
Y 3169	0.10	0.2	3.8	40.4	16.4	60.7	28.3	10.9
R 5906	0.10	0.4	4.9	44.9	8.1	58.3	28.6	13.1
Y 5556	0.03	0.1	7.0	40.2	8.1	55.5	27.8	16.7
Average Values								
F	1.81	1.9	4.9	31.2	10.3	50.1	37.0	12.8
NF	0.05	0.1	9.1	42.5	9.0	60.7	30.1	9.1

Sample Descriptions

Sample	Textural Class	Source
F 5292	Sandy Loam	Feature 21
NF 5016	Sandy Loam	Control Sample, General Matrix
F 505	Sandy Loam	Feature 73, Stratum 9
NF 1669	Sandy Loam	Control Sample, General Matrix
F 4987	Sandy Loam	Feature 111
NF 3429	Loam	Control Sample, General Matrix
F 2033	Loam	Feature 6, Stratum 7
F 3113	Silt Loam	Feature 6, Stratum 1
NF 2535	Sandy Loam	Control Sample, General Matrix
R 3168	Sandy Loam	Feature 6 non-fired(?), Stratum 3
Y 3169	Sandy Loam	Feature 6 non-fired(?), Stratum 4
R 5906	Sandy Loam	Feature 120 non-fired(?), Stratum 5
Y 5556	Sandy Loam	Feature 120 non-fired(?), Stratum 21

F = Fired, NF = Non-Fired, R = Red, Y = Yellow

Table 5.11. Site 22IT539: Chemical Characteristics of Selected Fired and Non-Fired Aggregates.

Sample	pH	Organic Matter	Exchangeable Cations*						Base Sat.**
			Ca	Mg	K	Na	H	Al	
F 2033	4.40	0.43	2.57	0.28	0.11	0.02	14.48	5.28	17.07
NF 2535	5.80	1.13	7.02	0.57	0.07	0.03	6.28	-	55.05
F4987	4.80	0.15	1.97	0.45	0.10	0.03	12.15	3.63	17.35
NF 3429	5.40	1.12	6.15	0.89	0.09	0.03	8.69	0.15	45.17
F 505	5.50	0.23	6.67	0.43	0.12	0.03	5.87	0.22	55.26
NF 1669	5.60	0.95	5.78	0.27	0.09	0.03	5.70	0.01	51.98
F 5292	5.90	0.31	7.96	0.66	0.18	0.03	15.11	0.10	36.88
NF 5016	5.90	1.04	7.94	1.14	0.15	0.03	6.92	-	57.23
Average Values									
F	5.15	0.28	4.79	0.45	0.13	0.03	11.90	2.31	31.64
NF	5.67	1.06	6.72	0.71	0.10	0.03	6.89	0.04	52.35

F = Fired, NF = Non-Fired, - = Not Detected

* Exchangeable Cations are measured in milliequivalents/100 g of soil.

** Base Saturation is listed in percentages.

Table 5.12. Site 22IT539: Summary of Mortuary Data.

Loc	FN	BN	Age	Sex	Pos	Or	Type	GG
Block A	109	1	Ind	Ind	Extend	N20°W	Pri, Mult	-
Block A	114	2	Adult	Ind	Extend	N40°W	Pri, Mult	-
Block A	126	4	30 yrs?	Female	Extend	N20°W	Pri, S	-
Block A	133	5	40 yrs?	Male	Extend	N10°W	Pri, Mult	+?
Block C	150	7	Adult	Male	Flexed	Ind	Pri, S	-
Block C	122	18	Young	Ind	Ind	Ind	Ind	-
Block D	153	9	Ind	Ind	Flexed	North	Pri, S	+
Block D	152	10	Adult	Ind	Extend	N5°W	Pri, Mult	-
Block D	158	11	Ind	Ind	Ind	NNW?	Pri, S	+
Block D	159	12	Ind	Ind	Ind	N5°W	Pri, S	-
Block D	162	13	Ind	Ind	Extend	N20°W	Pri, S	-
Block D	163	14	Adult	Ind	Extend	N?	Pri, Mult	-
Block D	144	17	Ind	Ind	Ind	Ind	Ind	-
Block D	134	19	Adult	Ind			Cremation	+
Strat Trench 2	164	15	Ind	Ind	Extend	N46°W	Pri, S	-
Strat Trench 2	165	16	Ind	Ind	Extend	N/S	Pri, S	-

Loc = Location, FN = Feature Number, BN = Burial Number, Pos = Position, Or = Orientation, GG = Grave Goods

Pri = Primary, Mult = Multiple, S = Single

+ = Grave goods were preser , - = Grave goods were not present

Table 5.13. Site 22IT539: Distribution of Decorated Shell Tempered Pottery.

Location	Moundville Incised, Var Moundville	Residual Incised	Residual Cord Marked	Total
Block A				
128S/88W, Level 3	-	-	1	1
130S/88W, Level 2	-	-	1	1
Block B				
140S/104W, Level 1	1	-	-	1
Block C				
98S/124W, Level 3	4	-	-	4
102S/122W, Level 3	2	-	-	2
102S/128W, Level 3	1	-	-	1
104S/128W, Level 3	-	-	1	1
104S/132W, Level 1	-	-	1	1
106S/124W, Level 2	1	-	-	1
106S/126W, Level 3	1	-	-	1
106S/132W, Level 1	2	-	-	2
106S/132W, Level 2	-	1	-	1
Test Unit				
130S/121W, Level 17*	1	-	-	1
Total	13	1	4	18

* Level 17 was the number assigned to the material found during cleanup of 130S/121W (the original test unit, dug by testing project crew). It contains material from Levels 1-17, not just Level 17.

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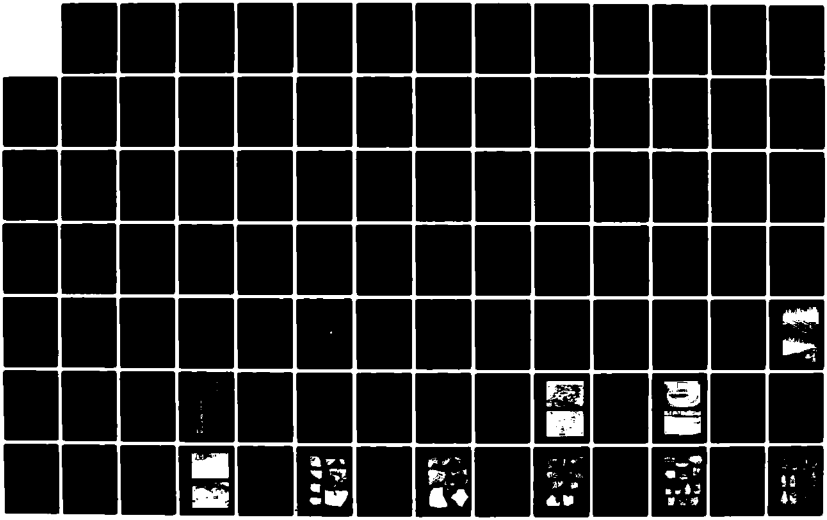
UNCLASSIFIED 1983 DACW01-80-C-0063 F/G 5/6 NL



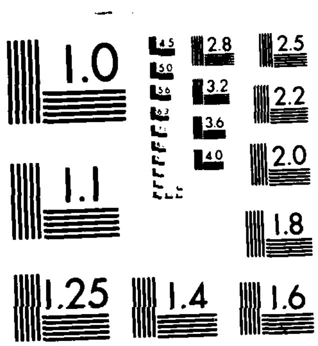

1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

Table 5.14. Site 22IT539: Distribution of Decorated Shell/Grog Tempered Pottery.

Location	Residual Cord Marked	Residual Incised	Smoothed-Over Fabric Marked	Total
Block A				
130S/88W, Level 2	2	-	-	2
Block B				
142S/102W, Level 1	2	-	-	2
142S/104W, Level 3	3	-	-	3
144S/102W, Level 1	1	-	-	1
144S/104W, Level 2	2	-	-	2
Block C				
96S/126W, Level 3	-	1	-	1
100S/126W, Level 3	1	-	-	1
104S/122W, Level 3	2	-	-	2
104S/122W, Level 5	-	-	1	1
104S/124W, Level 3	2	-	-	2
104S/132W, Level 2	1	-	-	1
106S/132W, Level 2	2	2	-	4
Test Unit				
118S/103W, Level 1	1	-	-	1
Total	19	3	1	23

Table 5.15. Site 22IT539: Ceramic "Other" Distribution.

Location	GROG		LIME-STONE	SAND			FIBER	
	Prob Coil Frag	Kiln Wad	Poss Flint River Brush	Alex Incd/ Punct	Columbus Punct	Poss Cord/ Fabric Marked	Wheeler Punct	Total
Block A								
128S/88W L 10	-	1	-	-	-	-	-	1
Block B								
140S/102W L 2	-	-	-	-	-	-	1	1
Block C								
100S/126W L 4	-	-	1	-	-	-	-	1
102S/128W L 3	-	-	-	-	-	1	-	1
104S/122W L 3	-	-	-	-	-	-	1	1
104S/122W L 4	1	-	1	-	-	-	-	2
106S/128W L 4	-	-	1	-	-	-	-	1
Test Units								
118S/103W L 1	-	-	-	1	1	-	-	2
Features								
No. 37	-	-	-	-	-	-	1	1
Total	1	1	3	1	1	1	3	11

Table 5.16. Site 22IT539: Projectile Point/Knife Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Benton Barbed				
WEIGHT	5	16	18.5	4.1	13.8	22.7	8.9	16.8
LENGTH	7	8	68.7	19.0	49.9	103.4	53.5	363.1
WIDTH	7	8	30.2	4.6	21.5	34.1	12.6	20.7
THK	8	7	7.8	1.0	6.4	9.0	2.6	1.0
BASLW	10	5	21.5	5.3	13.6	32.5	18.9	28.4
SHOULDRW	10	5	30.3	6.6	18.2	41.1	22.9	43.4
JUNCW	12	3	21.9	4.1	17.3	32.5	15.2	16.8
HAFTL	8	7	10.6	3.6	7.6	18.9	11.3	13.0
				Benton Extended Stemmed				
WEIGHT	9	43	16.0	5.9	10.0	26.5	16.5	34.9
LENGTH	10	42	64.2	10.4	52.2	82.3	30.1	107.8
WIDTH	27	35	31.2	4.5	20.6	38.7	18.1	20.5
THK	13	37	8.0	1.3	6.1	11.5	5.4	1.7
BASLW	48	4	21.8	3.5	16.0	31.2	15.2	12.2
SHOULDRW	35	27	31.1	3.6	24.1	38.1	14.0	13.2
JUNCW	46	6	22.3	2.1	18.5	26.6	8.1	4.3
HAFTL	41	11	13.0	1.9	8.9	17.7	8.8	3.6
				Benton Short Stemmed				
WEIGHT	30	133	16.7	6.4	8.0	33.0	25.0	40.4
LENGTH	33	130	65.0	21.6	39.6	126.5	86.9	465.1
WIDTH	80	83	31.3	3.2	20.3	37.5	17.2	10.3
THK	58	105	8.2	1.4	5.8	12.9	7.1	2.0
BASLW	112	51	21.3	3.8	10.8	33.4	22.6	14.3
SHOULDRW	105	58	30.8	3.0	23.8	37.0	13.2	9.1
JUNCW	137	26	22.6	2.4	17.5	29.4	11.9	5.6
HAFTL	100	63	10.4	2.5	0.0	22.2	22.2	6.0
				Big Sandy Side Notched				
WEIGHT	2	6	7.4	3.0	5.2	9.5	4.3	9.3
LENGTH	2	6	47.0	7.6	41.6	52.3	10.7	57.3
WIDTH	5	3	23.7	2.8	21.9	28.6	6.7	7.9
THK	5	3	7.2	0.8	6.1	8.2	2.1	0.6
BASLW	7	1	20.2	2.0	16.9	22.9	6.0	3.8
SHOULDRW	6	2	22.1	3.5	18.7	28.6	9.9	12.2
JUNCW	7	1	16.3	2.2	14.1	19.5	5.4	4.9
HAFTL	6	2	14.2	2.2	12.0	17.0	5.0	4.9

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Bradley Spike				
WEIGHT	2	0	4.8	0.4	4.5	5.1	0.6	0.2
LENGTH	2	0	48.1	1.8	46.8	49.4	2.6	3.4
WIDTH	2	0	16.3	5.9	12.1	20.4	8.3	34.5
THK	2	0	7.7	0.3	7.5	7.9	0.4	0.1
BASLW	2	0	6.7	0.5	6.3	7.0	0.7	0.3
SHOULDRW	2	0	15.4	4.6	12.1	18.6	6.5	21.1
JUNCW	2	0	11.2	1.8	9.9	12.5	2.6	3.4
HAFTL	2	0	11.4	1.2	10.5	12.2	1.7	1.4
				Crawford Creek				
WEIGHT	5	3	12.9	7.1	7.2	25.1	17.9	50.7
LENGTH	5	3	51.1	16.5	29.2	67.9	38.7	274.0
WIDTH	5	3	29.3	1.4	27.5	30.7	3.2	1.8
THK	7	1	8.8	2.2	6.2	12.0	5.8	4.9
BASLW	7	1	17.7	7.2	3.0	24.5	21.5	51.8
SHOULDRW	7	1	29.7	2.1	27.3	33.7	6.4	4.6
JUNCW	8	0	21.3	2.9	16.9	26.5	9.6	8.6
HAFTL	7	1	8.0	1.0	6.9	9.2	2.3	0.9
				Cypress Creek				
WEIGHT	1	10	22.3	-	22.3	22.3	0	-
LENGTH	1	10	50.3	-	50.3	50.3	0	-
WIDTH	6	5	39.6	6.0	32.5	49.0	16.5	36.5
THK	6	5	10.1	1.5	8.7	12.4	3.7	2.3
BASLW	7	4	22.9	6.5	12.4	29.5	17.1	42.0
SHOULDRW	7	4	37.8	5.6	31.4	47.2	15.8	31.4
JUNCW	10	1	22.9	5.1	14.1	29.5	15.4	26.4
HAFTL	7	4	8.7	2.5	6.0	13.2	7.2	6.2
				Dalton				
WEIGHT	2	0	6.5	0.5	6.1	6.8	0.7	0.2
LENGTH	2	0	40.5	4.5	37.3	43.7	6.4	20.4
WIDTH	2	0	23.7	0.9	23.1	24.4	1.3	0.8
THK	2	0	7.3	1.6	6.1	8.4	2.3	2.6
BASLW	2	0	23.2	1.1	22.4	24.0	1.6	1.3
SHOULDRW	1	1	23.1	-	23.1	23.1	0	-
JUNCW	2	0	21.5	1.6	20.4	22.6	2.2	2.4
HAFTL	2	0	14.2	4.5	11.0	17.4	6.4	20.4

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Elora				
WEIGHT	1	2	13.5	-	13.5	13.5	0	-
LENGTH	1	2	41.7	-	41.7	41.7	0	-
WIDTH	1	2	36.0	-	36.0	36.0	0	-
THK	1	2	11.5	-	11.5	11.5	0	-
BASLW	2	1	14.6	0.9	14.0	15.2	1.2	0.7
SHOULDRW	1	2	35.7	-	35.7	35.7	0	-
JUNCW	2	1	18.2	0.6	17.8	18.6	0.8	0.3
HAFTL	2	1	8.6	1.1	7.8	9.3	1.5	1.1
				Eva				
WEIGHT	1	3	7.9	-	7.9	7.9	0	-
LENGTH	1	3	34.9	-	34.9	34.9	0	-
WIDTH	2	2	27.9	1.5	26.8	28.9	2.1	2.2
THK	3	1	7.5	1.0	6.4	8.2	1.8	1.0
BASLW	3	1	14.3	2.0	12.1	16.1	4.0	4.1
SHOULDRW	2	2	27.2	2.2	25.6	28.7	3.1	4.8
JUNCW	3	1	13.5	3.3	9.8	16.1	6.3	10.8
HAFTL	3	1	2.9	0.4	2.6	3.3	0.7	0.1
				Flint Creek				
WEIGHT	4	5	8.9	4.9	5.2	15.9	10.7	23.8
LENGTH	4	5	43.0	6.3	36.0	49.7	13.7	39.7
WIDTH	5	4	22.3	3.4	19.7	27.8	8.1	11.3
THK	7	2	9.1	1.8	6.9	11.5	4.6	3.4
BASLW	8	1	13.8	2.7	10.3	18.7	8.4	7.2
SHOULDRW	6	3	21.5	3.0	19.5	27.4	7.9	8.7
JUNCW	8	1	15.4	2.5	12.4	19.1	6.7	6.2
HAFTL	7	2	11.8	1.8	9.1	14.8	5.7	3.3
				Gary				
WEIGHT	2	1	14.1	6.7	9.4	18.8	9.4	44.2
LENGTH	1	2	45.4	-	45.4	45.4	0	-
WIDTH	2	1	26.6	5.0	23.0	30.1	7.1	25.2
THK	2	1	11.9	2.1	10.4	13.4	3.0	4.5
BASLW	3	0	12.2	2.7	9.6	14.9	5.3	7.0
SHOULDRW	3	0	27.4	4.5	22.3	30.5	8.2	19.8
JUNC	3	0	18.3	3.4	14.4	20.5	6.1	11.5
HAFTL	3	0	12.4	2.4	11.0	15.1	4.1	5.6

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Kirk Corner Notched					
WEIGHT	4	10	8.7	2.7	5.9	11.0	5.1	7.2
LENGTH	6	8	49.0	7.0	41.3	60.0	18.7	49.2
WIDTH	8	6	29.5	1.7	27.4	32.6	5.2	2.9
THK	8	6	7.6	0.9	6.4	8.8	2.4	0.8
BASLW	9	5	24.0	3.7	19.7	29.3	9.6	13.4
SHOULDRW	9	5	29.1	2.2	26.6	32.5	5.9	5.0
JUNCW	11	3	18.6	1.8	16.2	21.4	5.2	3.1
HAFTL	8	6	8.9	1.7	6.4	10.6	4.2	2.7
			Ledbetter/Pickwick					
WEIGHT	0	7	-	-	-	-	-	-
LENGTH	0	7	-	-	-	-	-	-
WIDTH	3	4	35.0	1.3	33.6	36.2	2.6	1.7
THK	1	6	11.0	-	11.0	11.0	0	-
BASLW	4	3	17.7	5.9	9.0	21.8	12.8	34.6
SHOULDRW	4	3	35.2	2.9	32.7	38.8	6.1	8.2
JUNC	5	2	21.2	2.9	17.0	24.2	7.2	8.3
HAFTL	4	3	13.6	1.4	12.4	15.0	2.6	1.9
			Little Bear Creek					
WEIGHT	6	27	12.7	4.2	8.4	18.2	9.8	17.2
LENGTH	4	29	61.0	9.2	50.9	72.5	21.6	83.6
WIDTH	15	18	25.4	3.6	20.1	33.2	13.1	12.9
THK	17	16	9.7	1.2	7.6	11.2	3.6	1.5
BASLW	27	6	13.2	2.7	7.6	19.3	11.7	7.3
SHOUDLRW	21	12	25.4	4.0	18.7	34.0	15.3	16.0
JUNCW	32	1	17.1	2.3	13.1	21.3	8.2	5.0
HAFTL	25	8	13.1	2.4	9.5	19.9	10.4	5.8
			McCorkle Stemmed					
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	1	0	6.4	-	6.4	6.4	0	-
BASLW	1	0	19.4	-	19.4	19.4	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	1	0	18.7	-	18.7	18.7	0	-
HAFTL	1	0	11.6	-	11.6	11.6	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				McIntire				
WEIGHT	1	0	9.1	-	9.1	9.1	0	-
LENGTH	1	0	50.3	-	50.3	50.3	0	-
WIDTH	1	0	28.2	-	28.2	28.2	0	-
THK	1	0	8.4	-	8.4	8.4	0	-
BASLW	1	0	17.8	-	17.8	17.8	0	-
SHOULDRW	1	0	28.0	-	28.0	28.0	0	-
JUNCW	1	0	19.5	-	19.5	19.5	0	-
HAFTL	1	0	14.5	-	14.5	14.5	0	-
			Late Woodland/Mississippian Triangular					
WEIGHT	18	52	1.7	2.9	0.1	13.1	13.0	8.3
LENGTH	15	55	21.9	4.7	11.0	28.6	17.6	21.8
WIDTH	48	22	15.2	2.7	11.4	25.6	14.2	7.1
THK	39	31	3.8	0.7	2.7	5.6	2.9	0.5
BASLW	45	25	14.9	2.3	10.9	20.4	9.5	5.1
SHOULDRW	0	70	-	-	-	-	-	-
JUNCW	0	70	-	-	-	-	-	-
HAFTL	0	70	-	-	-	-	-	-
				Morrow Mountain				
WEIGHT	2	7	8.4	1.7	7.2	9.6	2.4	2.9
LENGTH	2	7	43.1	4.7	39.8	46.4	6.6	21.8
WIDTH	6	3	30.3	4.8	22.5	36.3	13.8	22.7
THK	6	3	7.5	1.2	5.7	8.9	3.2	1.3
BASLW	6	3	16.3	3.2	12.7	20.7	8.0	10.4
SHOULDRW	7	2	30.1	4.8	21.5	36.3	14.8	23.4
JUNCW	7	2	17.2	2.9	12.7	20.7	8.0	8.6
HAFTL	5	4	5.6	2.2	3.0	8.7	5.7	4.8
			Morrow Mountain Rounded Base					
WEIGHT	0	4	-	-	-	-	-	-
LENGTH	1	3	50.3	-	50.3	50.3	0	-
WIDTH	2	2	32.9	0.1	32.8	32.9	0.1	0.0
THK	2	2	8.1	3.3	5.7	10.4	4.7	11.1
BASLW	3	1	27.5	8.6	17.6	32.8	15.2	73.2
SHOULDRW	1	3	32.3	-	32.3	32.3	0	-
JUNCW	1	3	17.6	-	17.6	17.6	0	-
HAFTL	1	3	5.3	-	5.3	5.3	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Morrow Mountain Straight Base					
WEIGHT	6	8	11.5	1.5	10.0	14.0	4.0	2.1
LENGTH	8	6	47.2	4.0	42.0	52.6	10.6	16.3
WIDTH	12	2	32.8	3.6	25.0	37.5	12.5	13.2
THK	13	1	8.6	1.4	6.5	11.0	4.5	2.1
BASLW	10	4	14.4	4.0	9.8	23.3	13.5	15.8
SHOULDRW	12	2	32.1	3.4	24.4	37.3	12.9	11.8
JUNCW	14	0	18.5	3.1	14.1	23.3	9.2	9.5
HAFTL	10	4	7.2	1.3	5.0	8.9	3.9	1.7
			Mud Creek					
WEIGHT	0	3	-	-	-	-	-	-
LENGTH	0	3	-	-	-	-	-	-
WIDTH	0	3	-	-	-	-	-	-
THK	0	3	-	-	-	-	-	-
BASLW	2	1	14.0	3.8	11.3	16.6	5.3	14.1
SHOULDRW	1	2	20.8	-	20.8	20.8	0	-
JUNCW	1	2	15.7	-	15.7	15.7	0	-
HAFTL	1	2	10.8	-	10.8	10.8	0	-
			Residual Side Notched					
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	0	1	-	-	-	-	-	-
BASLW	1	0	17.7	-	17.7	17.7	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	0	1	-	-	-	-	-	-
HAFTL	0	1	-	-	-	-	-	-
			Residual Stemmed					
WEIGHT	14	65	9.6	6.3	1.4	27.4	26.0	39.7
LENGTH	16	63	42.9	9.4	25.6	60.0	34.4	87.9
WIDTH	32	47	26.6	5.0	15.3	37.7	22.4	25.1
THK	37	42	8.7	2.0	4.8	12.7	7.9	3.9
BASLW	38	41	17.5	5.0	9.0	29.8	20.8	24.7
SHOULDRW	34	45	26.2	5.0	15.3	37.5	22.2	24.6
JUNCW	53	26	18.9	3.1	10.7	24.5	13.8	9.9
HAFTL	35	44	11.4	7.8	5.7	53.9	48.2	60.2

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Residual Triangular				
WEIGHT	8	2	9.5	3.6	6.2	17.3	11.1	12.9
LENGTH	9	1	43.1	4.8	38.6	54.8	16.2	22.7
WIDTH	10	0	26.7	2.2	23.9	30.3	6.4	4.8
THK	9	1	8.1	1.6	6.2	10.6	4.4	2.6
BASLW	9	1	25.3	3.0	21.8	29.9	8.1	9.0
SHOULDRW	0	10	-	-	-	-	-	-
JUNCW	0	10	-	-	-	-	-	-
HAFTL	0	10	-	-	-	-	-	-
				Savannah River				
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	1	0	59.9	-	59.9	59.9	0	-
WIDTH	0	1	-	-	-	-	-	-
THK	1	0	11.1	-	11.1	11.1	0	-
BASLW	1	0	19.0	-	19.0	19.0	0	-
SHOULDRW	0	1	-	-	-	-	-	-
JUNCW	1	0	21.1	-	21.1	21.1	0	-
HAFTL	1	0	9.5	-	9.5	9.5	0	-
				Small Unfinished Triangular				
WEIGHT	7	6	3.1	1.5	1.2	4.7	3.5	2.4
LENGTH	6	7	26.4	4.3	20.2	31.4	11.2	18.3
WIDTH	11	2	18.0	4.0	11.6	22.9	11.3	15.4
THK	13	0	8.2	2.5	4.6	11.2	6.6	6.3
BASLW	12	1	16.3	4.0	10.6	22.8	12.2	16.0
SHOULDRW	0	13	-	-	-	-	-	-
JUNCW	0	13	-	-	-	-	-	-
HAFTL	0	13	-	-	-	-	-	-
				Sykes/White Springs				
WEIGHT	11	73	11.3	2.5	7.2	15.2	8.0	6.3
LENGTH	14	70	51.4	7.7	39.7	68.3	28.6	59.2
WIDTH	47	37	30.1	3.0	22.4	37.3	14.9	8.8
THK	29	55	8.3	1.4	6.3	12.7	6.4	1.9
BASLW	54	30	21.0	3.6	13.8	33.9	20.1	12.7
SHOULDRW	53	41	28.8	3.0	20.5	36.9	16.4	9.0
JUNCW	68	16	21.5	3.0	12.5	31.3	18.8	9.3
HAFTL	52	32	8.0	1.6	4.9	12.1	7.2	2.4

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Vaughn				
WEIGHT	2	2	16.3	8.7	10.1	22.4	12.3	75.7
LENGTH	2	2	39.0	7.0	34.0	43.9	9.9	49.0
WIDTH	4	0	28.4	2.8	26.8	32.6	5.8	8.0
THK	4	0	11.4	1.4	10.0	13.2	3.2	1.8
BASLW	2	2	18.5	3.9	15.7	21.2	5.5	15.1
SHOULDRW	4	0	27.8	2.9	26.1	32.2	6.1	8.6
JUNCW	2	2	22.1	3.1	19.9	24.3	4.4	9.7
HAFTL	2	2	10.2	3.5	7.7	12.7	5.0	12.5

Table 5.17 Site 22IT539: Biface Blade Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Ovoid Biface Blade on a Flake								
WEIGHT	1	0	21.0	-	21.0	21.0	0	-
LENGTH	1	0	54.1	-	54.1	54.1	0	-
WIDTH	1	0	37.8	-	37.8	37.8	0	-
THK	1	0	8.8	-	8.8	8.8	0	-
Ovoid Biface Blade on Other								
WEIGHT	1	0	36.5	-	36.5	36.5	0	-
LENGTH	1	0	68.9	-	68.9	68.9	0	-
WIDTH	1	0	44.2	-	44.2	44.2	0	-
THK	1	0	11.1	-	11.1	11.1	0	-
Triangular Biface Blade on a Flake								
WEIGHT	4	1	15.8	3.5	11.0	19.4	8.4	12.3
LENGTH	4	1	51.4	1.9	48.8	52.9	4.1	3.7
WIDTH	5	0	31.2	5.1	24.0	35.6	11.6	25.8
THK	5	0	10.0	1.5	7.9	12.0	4.1	2.4
Triangular Biface Blade on Other								
WEIGHT	14	13	20.9	15.5	6.0	57.4	51.4	239.6
LENGTH	15	12	57.3	14.3	32.3	82.3	50.1	204.3
WIDTH	25	2	32.3	7.4	22.6	51.8	29.2	54.8
THK	24	3	10.0	2.1	6.3	15.6	9.3	4.6
Narrow Triangular Biface Blade on a Flake								
WEIGHT	1	1	23.9	-	23.9	23.9	0	-
LENGTH	1	1	55.9	-	55.9	55.9	0	-
WIDTH	2	0	26.8	18.7	13.6	40.0	26.4	348.5
THK	2	0	10.2	2.1	8.8	11.7	2.4	4.2
Expanding Triangular Biface Blade on a Flake								
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	1	0	38.5	-	38.5	38.5	0	-
THK	1	0	10.4	-	10.4	10.4	0	-
ELEML	1	0	43.6	-	43.6	43.6	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Expanding Triangular Biface Blade on Other					
WEIGHT	0	1	-	-	-	-	-	-
LENGTH	0	1	-	-	-	-	-	-
WIDTH	0	1	-	-	-	-	-	-
THK	1	0	8.6	-	8.6	8.6	0	-
ELEML	0	1	-	-	-	-	-	-
			Broad Based Triangular Biface Blade on a Flake					
WEIGHT	1	0	15.8	-	15.8	15.8	0	-
LENGTH	1	0	51.0	-	51.0	51.0	0	-
WIDTH	1	0	36.0	-	36.0	36.0	0	-
THK	1	0	10.0	-	10.0	10.0	0	-
BASLW	1	0	34.0	-	34.0	34.0	0	-
			Broad Based Triangular Biface Blade on Other					
WEIGHT	4	3	15.3	6.5	6.6	28.0	21.4	42.5
LENGTH	10	2	46.2	5.4	38.8	55.8	17.0	29.0
WIDTH	10	2	32.2	4.5	8.1	43.7	35.6	40.6
THK	11	1	12.6	4.7	6.4	40.9	34.5	93.2
BASLW	9	3	32.7	3.8	26.5	39.4	12.9	14.7

Table 5.18. Site 22IT539: Preform Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Preform 1 - Cobble					
WEIGHT	11	0	61.5	27.7	12.8	106.4	93.6	766.1
LENGTH	11	0	60.1	19.3	15.7	88.2	72.5	370.7
WIDTH	11	0	43.2	8.7	25.9	58.1	32.2	75.1
THK	11	0	25.4	6.7	12.4	39.2	26.8	44.8
			Preform 1 - Flake					
WEIGHT	14	0	28.9	12.0	11.8	47.5	35.7	143.5
LENGTH	14	0	50.4	10.4	38.2	77.7	39.5	107.9
WIDTH	14	0	41.5	8.1	26.2	56.8	30.6	66.3
THK	14	0	16.0	3.3	11.0	21.2	10.2	10.7
			Preform 1 - Indeterminate					
WEIGHT	30	0	32.9	19.0	13.3	81.3	68.0	361.6
LENGTH	30	0	51.4	8.1	36.3	72.5	36.2	65.9
WIDTH	30	0	38.2	8.3	25.8	60.3	34.5	69.7
THK	30	0	19.3	5.1	12.2	29.6	17.4	25.8
			Preform 2 - Flake					
WEIGHT	12	7	16.1	3.9	10.0	20.7	10.7	15.5
LENGTH	14	5	51.2	9.9	29.7	70.9	41.2	99.0
WIDTH	17	2	34.8	8.9	20.4	55.5	35.1	79.7
THK	15	4	11.2	2.0	7.4	14.2	6.8	4.0
			Preform 2 - Indeterminate					
WEIGHT	26	6	27.5	16.7	8.8	61.0	52.2	280.2
LENGTH	26	6	52.7	11.6	32.2	74.8	42.6	135.4
WIDTH	31	1	34.3	7.5	17.5	48.4	30.9	56.6
THK	28	4	14.9	6.1	1.7	30.4	28.7	37.6
			Quarry Blade					
WEIGHT	7	0	42.2	7.3	34.2	50.3	16.1	53.0
LENGTH	7	0	113.9	4.6	108.4	121.2	12.8	21.4
WIDTH	7	0	41.5	4.3	35.1	47.8	12.7	18.3
THK	7	0	8.6	0.7	7.4	9.4	2.0	0.5

Table 5.19. Site 22IT539: Core Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			90° - Unifacial					
WEIGHT	30	0	103.4	74.2	8.0	311.4	303.4	5500.2
LENGTH	30	0	60.7	17.3	25.8	98.4	72.6	298.7
WIDTH	30	0	46.0	13.0	21.6	66.7	45.1	168.7
THK	30	0	32.7	9.6	12.3	46.4	34.1	92.0
			90° - Bifacial					
WEIGHT	3	0	94.7	7.7	87.0	102.3	15.3	58.5
LENGTH	3	0	64.5	7.6	55.7	69.0	13.3	57.7
WIDTH	3	0	52.2	10.5	44.6	64.2	19.6	110.6
THK	3	0	32.8	1.7	30.9	34.0	3.1	2.8
			180° - Unifacial Opposing					
WEIGHT	5	0	151.7	122.7	33.3	360.0	326.7	15053.9
LENGTH	5	0	67.7	15.4	47.5	88.1	40.6	236.2
WIDTH	5	0	56.1	10.6	42.2	70.4	28.2	112.3
THK	5	0	40.0	14.4	22.2	62.4	40.2	208.2
			180° - Bifacial Opposing					
WEIGHT	1	0	12.3	-	12.3	12.3	0	-
LENGTH	1	0	31.8	-	31.8	31.8	0	-
WIDTH	1	0	21.0	-	21.0	21.0	0	-
THK	1	0	19.0	-	19.0	19.0	0	-
			180° - Unifacial Adjacent					
WEIGHT	17	0	70.4	41.3	8.4	162.5	154.1	1707.3
LENGTH	17	0	55.0	10.5	33.6	73.4	39.8	110.3
WIDTH	17	0	45.0	12.0	28.4	68.9	40.5	144.5
THK	17	0	28.7	9.7	13.6	48.0	34.4	93.3
			180° - Bifacial Adjacent					
WEIGHT	2	0	31.6	9.0	25.3	38.0	12.7	80.6
LENGTH	2	0	50.1	1.5	49.1	51.2	2.1	2.2
WIDTH	2	0	37.8	7.4	32.5	43.0	10.5	55.1
THK	2	0	19.3	6.2	14.9	23.7	8.8	38.7

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			270° - Unifacial					
WEIGHT	12	0	65.7	74.1	21.8	283.7	261.9	5487.6
LENGTH	12	0	50.6	15.3	33.6	80.8	47.2	233.6
WIDTH	12	0	41.5	12.5	27.6	72.4	44.8	156.7
THK	12	0	29.2	10.6	17.0	54.6	37.6	112.5
			270° - Bifacial					
WEIGHT	1	0	49.1	-	49.1	49.1	0	-
LENGTH	1	0	45.1	-	45.1	45.1	0	-
WIDTH	1	0	33.8	-	33.8	33.8	0	-
THK	1	0	30.8	-	30.8	30.8	0	-
			360° - Unifacial					
WEIGHT	7	0	53.9	20.7	25.0	85.1	60.1	427.3
LENGTH	7	0	57.7	8.4	45.8	71.0	25.2	79.8
WIDTH	7	0	42.3	7.6	30.8	55.5	24.7	57.6
THK	7	0	26.3	4.4	22.4	33.5	11.1	19.6
			360° - Bifacial					
WEIGHT	7	0	55.0	38.2	19.7	124.3	104.6	1462.7
LENGTH	7	0	49.9	13.8	35.2	73.5	38.3	190.5
WIDTH	7	0	41.7	11.5	30.3	55.6	25.3	131.9
THK	7	0	25.7	5.7	19.1	35.0	15.9	32.2
			Bipolar Core					
WEIGHT	5	0	6.4	4.1	1.0	11.0	10.0	17.0
LENGTH	5	0	19.5	10.3	2.7	28.6	25.4	105.5
WIDTH	5	0	18.9	6.9	8.1	24.9	16.8	48.1
THK	5	0	11.5	4.6	5.4	17.7	12.3	21.0
			Blade Core					
WEIGHT	1	0	151.4	-	151.4	151.4	0	-
LENGTH	1	0	67.9	-	67.9	67.9	0	-
WIDTH	1	0	50.9	-	50.9	50.9	0	-
THK	1	0	41.9	-	41.9	41.9	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Microblade Core				
WEIGHT	3	0	8.5	5.0	3.0	12.9	9.9	25.3
LENGTH	3	0	32.5	9.4	22.9	41.7	18.8	88.5
WIDTH	3	0	21.6	4.1	17.4	25.6	8.2	16.8
THK	3	0	16.6	5.4	11.5	22.2	10.7	28.9
				Core - Other				
WEIGHT	2	0	19.3	21.7	4.0	34.7	30.7	471.2
LENGTH	2	0	36.1	2.5	34.3	37.9	3.6	6.5
WIDTH	2	0	26.7	4.2	23.8	29.7	5.9	17.4
THK	2	0	23.6	6.4	19.1	28.1	9.0	40.5

Table 5.20. Site 22IT539: Scraper Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Uniface Side Scraper on Blade/Blade-Like Flake								
WEIGHT	7	0	9.3	7.4	1.0	17.6	16.6	54.2
LENGTH	7	0	47.7	20.9	20.5	81.7	61.2	437.3
WIDTH	7	0	23.6	10.4	9.0	38.2	29.2	108.9
THK	7	0	6.9	2.3	3.8	10.5	6.7	5.1
Uniface End Scraper on Blade/Blade-Like Flake								
WEIGHT	3	0	5.8	4.4	3.0	10.9	7.9	19.3
LENGTH	3	0	34.7	6.7	27.0	39.0	12.0	45.0
WIDTH	3	0	23.6	8.1	17.5	32.8	15.3	65.4
THK	3	0	7.2	2.9	5.2	10.5	5.3	8.4
Uniface Side-End Scraper on Blade/Blade-Like Flake								
WEIGHT	3	0	5.6	4.0	2.9	10.2	7.3	15.8
LENGTH	3	0	36.7	8.7	27.9	45.3	17.4	75.7
WIDTH	3	0	20.8	3.4	17.6	24.3	6.7	11.3
THK	3	0	6.0	2.4	4.4	8.8	4.4	5.8
Uniface Side Scraper on Expanding Flake								
WEIGHT	14	0	8.6	4.7	2.0	19.2	17.2	22.3
LENGTH	14	0	37.1	8.2	26.4	52.0	25.6	67.3
WIDTH	14	0	32.2	7.9	19.6	45.7	26.1	61.6
THK	14	0	8.1	2.1	4.7	12.0	7.3	4.5
Uniface End Scraper on Expanding Flake								
WEIGHT	22	0	6.0	5.2	1.0	21.1	20.1	27.5
LENGTH	22	0	29.8	11.5	4.4	56.0	51.6	132.7
WIDTH	22	0	24.9	6.9	16.3	39.0	22.7	47.5
THK	22	0	7.2	2.9	3.5	16.3	12.8	8.6
Uniface Side-End Scraper on Expanding Flake								
WEIGHT	12	0	8.8	8.6	2.0	27.6	25.6	73.3
LENGTH	12	0	32.7	8.2	21.3	44.2	22.9	67.1
WIDTH	12	0	28.1	10.8	18.4	53.2	34.8	116.0
THK	12	0	7.7	4.4	1.5	16.3	14.8	19.1

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Uniface Side Scraper on Other Flake					
WEIGHT	39	0	7.8	7.4	0.5	33.6	33.1	54.0
LENGTH	39	0	32.4	11.3	15.0	56.5	41.5	127.4
WIDTH	39	0	25.3	10.4	8.1	56.9	48.8	107.5
THK	39	0	8.8	4.1	4.0	19.4	15.4	16.7
			Uniface End Scraper on Other Flake					
WEIGHT	22	0	6.3	6.5	1.6	26.6	25.0	42.4
LENGTH	22	0	30.4	12.9	14.0	61.4	47.4	165.2
WIDTH	22	0	24.3	5.3	16.8	36.8	20.0	28.2
THK	22	0	8.1	4.4	2.9	22.8	19.9	19.7
			Uniface Side-End Scraper on Other Flake					
WEIGHT	19	0	3.5	2.6	1.0	12.5	11.5	6.9
LENGTH	19	0	25.6	9.4	13.8	51.5	37.7	88.0
WIDTH	19	0	20.8	5.0	12.4	30.6	18.2	25.1
THK	19	0	5.9	2.0	2.3	11.0	8.7	3.9
			Uniface End Scraper on Thermal Spall					
WEIGHT	1	0	17.3	-	17.3	17.3	0	-
LENGTH	1	0	56.7	-	56.7	56.7	0	-
WIDTH	1	0	32.8	-	32.8	32.8	0	-
THK	1	0	12.5	-	12.5	12.5	0	-
			Uniface Side Scraper on Thermal Spall					
WEIGHT	2	0	18.0	18.4	5.0	31.0	26.0	338.0
LENGTH	2	0	40.8	13.1	31.5	50.0	18.5	171.1
WIDTH	2	0	28.5	10.0	21.5	35.6	14.1	99.4
THK	2	0	14.8	3.5	12.4	17.3	4.9	12.0
			Uniface Side-End Scraper on Thermal Spall					
WEIGHT	1	0	4.9	-	4.9	4.9	0	-
LENGTH	1	0	29.7	-	29.7	29.7	0	-
WIDTH	1	0	24.2	-	24.2	24.2	0	-
THK	1	0	8.2	-	8.2	8.2	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Biface Hafted End Scraper					
WEIGHT	3	0	9.5	6.0	5.5	16.4	10.9	36.0
LENGTH	3	0	37.0	19.5	22.8	59.3	36.5	381.5
WIDTH	3	0	26.3	3.5	24.1	30.4	6.3	12.4
THK	3	0	9.0	1.3	8.0	10.4	2.4	1.6
			Uniface Cobble Scraper					
WEIGHT	1	0	2.0	-	2.0	2.0	0	-
LENGTH	1	0	20.4	-	20.4	20.4	0	-
WIDTH	1	0	15.3	-	15.3	15.3	0	-
THK	1	0	7.4	-	7.4	7.4	0	-
			Scraper on Biface Fragment (Recycled)					
WEIGHT	14	0	6.6	4.2	1.7	16.9	15.2	17.8
LENGTH	14	0	32.3	4.0	19.7	48.9	29.2	80.6
WIDTH	14	0	24.4	8.4	12.5	41.0	28.5	69.8
THK	14	0	7.7	1.7	5.5	12.3	6.8	3.0
			Scraper on Core (Recycled)					
WEIGHT	1	0	25.9	-	25.9	25.9	0	-
LENGTH	1	0	41.0	-	41.0	41.0	0	-
WIDTH	1	0	35.0	-	35.0	35.0	0	-
THK	1	0	20.7	-	20.7	20.7	0	-
			Notched Flake/Spokeshave					
WEIGHT	21	0	3.4	3.0	0.4	9.7	9.3	8.9
LENGTH	21	0	27.4	10.1	13.8	55.2	41.4	102.8
WIDTH	21	0	19.7	7.6	4.7	31.2	26.5	57.1
THK	21	0	6.2	2.7	2.5	12.8	10.3	7.4
			Scraper Other					
WEIGHT	1	0	9.3	-	9.3	9.3	0	-
LENGTH	1	0	33.8	-	33.8	33.8	0	-
WIDTH	1	0	30.0	-	30.0	30.0	0	-
THK	1	0	9.3	-	9.3	9.3	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Biface Scraper on Flake								
WEIGHT	4	0	8.4	5.6	3.5	15.3	11.8	31.2
LENGTH	4	0	34.9	13.2	23.0	50.8	27.8	175.4
WIDTH	4	0	26.9	8.5	19.1	38.0	18.9	71.4
THK	4	0	8.5	1.9	7.2	11.3	4.1	3.6
Graver Scraper								
WEIGHT	1	0	2.5	-	2.5	2.5	0	-
LENGTH	1	0	26.2	-	26.2	26.2	0	-
WIDTH	1	0	16.4	-	16.4	16.4	0	-
THK	1	0	8.1	-	8.1	8.1	0	-
Uniface Hafted End Scraper								
WEIGHT	3	0	6.8	2.4	4.2	10.0	5.8	8.7
LENGTH	3	0	32.4	5.7	26.4	37.8	11.4	32.7
WIDTH	3	0	21.8	1.9	20.0	23.8	3.8	3.7
THK	3	0	9.4	3.2	5.8	12.1	6.3	10.4
Ovoid Biface Scraper (Recycled)								
WEIGHT	1	0	3.6	-	3.6	3.6	0	-
LENGTH	1	0	22.0	-	22.0	22.0	0	-
WIDTH	1	0	20.0	-	20.0	20.0	0	-
THK	1	0	8.0	-	8.0	8.0	0	-
Hafted End Scraper (Recycled)								
WEIGHT	3	0	5.0	2.5	3.3	7.9	4.6	6.5
LENGTH	3	0	25.1	6.7	19.0	32.3	13.3	45.1
WIDTH	3	0	27.5	4.5	23.8	32.5	8.7	20.1
THK	3	0	6.5	0.7	5.7	7.1	1.4	0.5

Table 5.21. Site 22IT539: Drill, Perforator, Etc. Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Shaft Drill								
WEIGHT	12	2	4.7	3.6	1.7	15.3	13.6	13.1
LENGTH	12	2	43.5	12.9	21.4	62.4	41.0	167.1
WIDTH	14	0	11.2	2.0	8.7	16.5	7.8	3.8
THK	14	0	7.9	1.3	6.3	11.4	5.1	1.8
Expanding Base Drill								
WEIGHT	12	5	7.3	11.0	2.6	42.0	39.4	120.5
LENGTH	12	5	42.5	8.3	26.8	51.8	25.0	68.7
WIDTH	16	1	20.7	8.8	12.3	44.9	32.6	76.6
THK	17	0	7.5	1.1	5.9	10.0	4.1	1.1
Stemmed Drill (Recycled)								
WEIGHT	8	1	5.9	2.1	3.6	9.7	6.1	4.4
LENGTH	8	1	45.1	10.0	32.1	59.0	26.9	100.3
WIDTH	8	1	22.5	3.2	18.8	28.0	9.2	10.4
THK	9	0	8.2	1.6	5.8	10.4	4.6	2.7
Reamer								
WEIGHT	7	0	10.3	4.1	5.2	17.7	12.5	17.2
LENGTH	7	0	45.0	12.8	33.2	68.4	35.2	163.7
WIDTH	7	0	25.3	4.4	17.4	30.3	12.9	19.4
THK	7	0	11.9	3.3	6.7	16.5	9.8	10.8
Perforator								
WEIGHT	25	0	2.5	2.1	0.6	7.9	7.3	4.3
LENGTH	24	1	27.3	7.6	13.4	40.1	26.7	57.8
WIDTH	24	1	17.6	5.2	9.9	30.3	20.4	26.5
THK	25	0	5.5	1.9	2.6	8.9	6.3	3.5
Graver								
WEIGHT	9	0	3.2	1.2	1.7	5.4	3.7	1.5
LENGTH	9	0	27.6	5.1	19.6	33.8	14.2	25.7
WIDTH	9	0	22.1	4.1	18.1	30.2	12.1	16.9
THK	9	0	6.8	1.8	3.9	9.0	5.1	3.1

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Microlith				
WEIGHT	4	0	0.9	0.5	0.4	1.4	1.0	0.2
LENGTH	4	0	22.1	10.2	12.3	32.2	19.9	103.5
WIDTH	4	0	9.3	2.8	7.2	13.3	6.1	7.7
THK	4	0	3.7	0.9	2.8	4.6	1.8	0.7
				Denticulate				
WEIGHT	4	0	8.0	8.3	1.5	18.9	17.4	68.4
LENGTH	4	0	33.3	9.8	22.0	41.5	19.5	95.5
WIDTH	4	0	21.9	11.6	10.8	32.8	22.0	135.3
THK	4	0	9.1	6.1	4.0	17.8	13.8	36.9
				Microperforator				
WEIGHT	1	0	0.4	-	0.4	0.4	0	-
LENGTH	1	0	16.8	-	16.8	16.8	0	-
WIDTH	1	0	8.9	-	8.9	8.9	0	-
THK	1	0	4.4	-	4.4	4.4	0	-
				Reamer (Recycled)				
WEIGHT	2	0	6.5	2.9	4.5	8.6	4.1	8.4
LENGTH	2	0	43.0	2.8	41.1	45.0	3.9	7.6
WIDTH	2	0	21.0	8.1	15.3	26.8	11.5	66.1
THK	2	0	9.2	2.4	7.5	10.9	3.4	5.8
				Perforator (Recycled)				
WEIGHT	1	0	14.3	-	14.3	14.3	0	-
LENGTH	1	0	51.0	-	51.0	51.0	0	-
WIDTH	1	0	25.8	-	25.8	25.8	0	-
THK	1	0	11.0	-	11.0	11.0	0	-

Table 5.22. Site 22IT539: Other Uniface and Biface Tool Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Uniface Chopper								
WEIGHT	9	0	156.6	165.4	44.7	528.2	483.5	
LENGTH	9	0	75.3	12.1	63.2	100.8	37.6	
WIDTH	9	0	55.1	16.6	38.9	88.5	49.6	
THK	9	0	32.4	15.2	16.0	57.8	41.8	
Biface Chopper								
WEIGHT	21	0	138.0	96.0	48.2	432.9	384.7	
LENGTH	21	0	68.7	12.4	47.3	106.0	58.7	
WIDTH	21	0	55.6	8.5	43.2	76.0	32.8	
THK	21	0	32.8	11.0	15.4	54.6	39.2	
Uniface Adze								
WEIGHT	6	0	83.7	50.9	20.5	139.2	118.7	
LENGTH	6	0	56.6	12.5	36.6	71.5	34.9	
WIDTH	6	0	48.7	15.5	33.0	68.2	35.2	
THK	6	0	23.2	6.9	14.2	31.0	16.8	
Biface Adze								
WEIGHT	5	0	28.9	6.0	23.9	37.0	13.1	
LENGTH	5	0	44.0	6.0	35.7	50.8	15.1	
WIDTH	5	0	36.6	4.1	32.1	41.6	9.5	
THK	5	0	17.3	1.7	15.2	19.6	4.4	
Uniface Flake Knife								
WEIGHT	23	0	25.5	30.6	3.0	123.3	120.3	
LENGTH	23	0	53.6	16.0	31.2	87.4	56.2	
WIDTH	23	0	35.5	12.2	21.7	66.3	44.6	
THK	22	1	11.5	6.1	4.0	29.6	25.6	
Biface Flake Knife								
WEIGHT	24	0	12.8	8.9	2.1	30.1	28.0	
LENGTH	24	0	45.0	11.6	29.0	64.0	35.0	
WIDTH	24	0	29.3	9.3	13.0	47.2	34.2	
THK	24	0	9.3	3.4	5.0	16.2	11.2	

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Uniface Cobble Knife								
WEIGHT	1	0	22.2	-	22.2	22.2	0	-
LENGTH	1	0	42.3	-	42.3	42.3	0	-
WIDTH	1	0	32.4	-	32.4	32.4	0	-
THK	1	0	19.0	-	19.0	19.0	0	-
Biface Cobble Knife								
WEIGHT	1	0	20.4	-	20.4	20.4	0	-
LENGTH	1	0	41.4	-	41.4	41.4	0	-
WIDTH	1	0	36.0	-	36.0	36.0	0	-
THK	1	0	14.4	-	14.4	14.4	0	-
Biface Digging Implement								
WEIGHT	1	0	656.9	-	656.9	656.9	0	-
LENGTH	1	0	109.8	-	109.8	109.8	0	-
WIDTH	1	0	79.2	-	79.2	79.2	0	-
THK	1	0	46.5	-	46.5	46.5	0	-
Uniface/Biface Other								
WEIGHT	2	0	25.8	4.9	22.3	29.3	7.0	
LENGTH	2	0	37.5	12.0	29.1	46.0	16.9	
WIDTH	2	0	39.5	6.7	34.8	44.3	9.5	
THK	2	0	19.5	7.6	14.2	24.9	10.7	
Wedge								
WEIGHT	12	0	23.4	21.2	1.3	66.9	65.6	
LENGTH	12	0	41.8	19.9	14.4	69.3	54.9	
WIDTH	12	0	27.0	7.6	16.6	37.0	20.4	
THK	12	0	15.8	8.1	4.2	28.0	23.8	
Chopper/Hammerstone								
WEIGHT	2	0	387.2	381.7	117.3	657.1	539.8	
LENGTH	2	0	77.5	18.7	64.3	40.7	26.4	
WIDTH	2	0	76.3	16.4	64.7	87.9	23.2	
THK	2	0	44.9	23.2	28.5	61.3	32.8	

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Chisel				
WEIGHT	5	0	23.9	21.5	2.4	58.6	56.2	
LENGTH	5	0	44.6	13.4	29.2	59.4	30.2	
WIDTH	5	0	28.8	12.8	11.4	43.3	31.9	
THK	5	0	15.9	6.5	7.8	25.0	17.2	
				Biface Knife on Thermal Spall				
WEIGHT	1	0	17.5	-	17.5	17.5	0	-
LENGTH	1	0	31.9	-	31.9	31.9	0	-
WIDTH	1	0	33.2	-	33.2	33.2	0	-
THK	1	0	14.4	-	14.4	14.4	0	-
				Piece Esquille (Splintered Wedge)				
WEIGHT	5	0	4.3	2.8	2.1	8.5	6.4	
LENGTH	5	0	24.2	7.4	16.0	35.7	19.7	
WIDTH	5	0	19.8	4.6	14.8	24.5	9.7	
THK	5	0	7.4	2.2	5.2	10.5	5.3	
				Piece Esquille on Biface (Splintered Wedge) (Recycled)				
WEIGHT	3	0	5.2	3.1	3.1	8.7	5.6	
LENGTH	3	0	28.2	1.4	27.1	29.8	2.7	
WIDTH	3	0	18.1	5.8	12.7	24.2	11.5	
THK	3	0	8.9	3.6	6.4	13.0	6.6	

Table 5.23. Site 22IT539: Ground Stone Tools Measurement Summary Data.

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Hammerstone				
WEIGHT	39	0	145.4	48.3	28.6	396.0	367.4	4668.2
LENGTH	39	0	62.9	14.3	42.1	101.4	59.3	203.9
WIDTH	39	0	50.4	11.4	35.0	71.4	36.4	129.6
THK	39	0	36.0	4.8	20.0	65.4	45.4	97.0
				Anvilstone				
WEIGHT	3	0	460.1	350.3	182.6	853.7	671.1	122714.8
LENGTH	3	0	110.1	52.7	77.8	171.0	93.2	2782.2
WIDTH	3	0	83.1	32.0	63.5	120.0	56.5	1024.3
THK	3	0	38.2	12.1	27.5	51.3	23.8	146.2
				Pitted Anvilstone				
WEIGHT	13	0	338.7	279.6	115.4	1072.1	956.7	78161.2
LENGTH	13	0	92.8	21.1	68.8	141.8	73.0	445.6
WIDTH	13	0	71.1	17.4	50.1	112.0	61.9	302.5
THK	13	0	37.6	10.1	24.7	57.9	33.2	102.9
				Hammer/Anvilstone				
WEIGHT	5	0	194.2	93.8	48.7	292.6	243.9	8799.8
LENGTH	5	0	82.6	24.6	55.4	122.2	66.8	603.6
WIDTH	5	0	56.0	7.8	47.6	67.3	19.7	61.0
THK	5	0	34.4	9.2	23.6	47.4	23.8	84.3
				Abrader				
WEIGHT	12	0	176.1	148.4	16.3	510.7	494.4	22020.4
LENGTH	12	0	78.2	27.6	35.0	130.3	95.3	764.5
WIDTH	12	0	55.6	25.4	23.9	101.9	78.0	646.7
THK	12	0	27.0	10.8	9.3	47.6	38.3	117.7
				Muller				
WEIGHT	6	0	271.5	156.4	111.3	540.4	429.1	24473.4
LENGTH	6	0	79.0	20.2	54.9	108.0	53.1	408.2
WIDTH	6	0	62.6	17.5	40.7	79.6	38.9	307.0
THK	6	0	33.4	4.1	27.8	37.8	10.0	16.6

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
Mortar								
WEIGHT	4	0	923.2	498.9	493.8	1643.2	1149.4	248881.4
LENGTH	4	0	144.3	33.7	117.2	192.0	74.8	1136.6
WIDTH	4	0	119.6	32.9	95.3	168.0	72.7	1084.4
THK	4	0	43.4	12.6	27.7	58.3	30.6	159.5
Pestle								
WEIGHT	1	0	433.7	-	433.7	433.7	0	-
LENGTH	1	0	99.5	-	99.5	99.5	0	-
WIDTH	1	0	67.6	-	67.6	67.6	0	-
THK	1	0	46.4	-	46.4	46.4	0	-
Grooved Axe								
WEIGHT	1	0	529.2	-	529.2	529.2	0	-
LENGTH	1	0	114.7	-	114.7	114.7	0	-
WIDTH	1	0	72.8	-	72.8	72.8	0	-
THK	1	0	38.4	-	38.4	38.4	0	-
Atlatl Weight								
WEIGHT	2	0	55.7	4.7	52.4	59.0	6.6	21.8
LENGTH	2	0	43.4	0.5	43.1	43.8	0.7	0.2
WIDTH	2	0	33.1	6.2	28.7	37.5	8.8	38.7
THK	2	0	21.4	5.9	17.3	25.6	8.3	34.4
HOLEDIAM	2	0	10.8	6.9	6.0	15.7	9.7	47.0
Bead								
WEIGHT	12	0	3.9	5.3	0.3	20.3	20.0	28.0
LENGTH	12	0	13.7	9.3	1.1	31.9	30.8	87.0
WIDTH	12	0	12.4	4.6	5.0	18.8	13.8	21.2
THK	12	0	12.5	6.7	4.0	29.6	25.6	45.3
HOLEDIAM	12	0	5.3	2.0	2.0	7.9	5.9	3.9
Muller/Pitted Anvilstone								
WEIGHT	3	0	366.2	139.6	256.7	523.4	266.7	19493.5
LENGTH	3	0	104.3	39.7	78.4	150.0	71.6	1573.7
WIDTH	3	0	70.9	8.7	61.9	79.3	17.4	76.0
THK	3	0	38.5	8.0	32.9	47.7	14.8	64.5

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
				Drill Core				
WEIGHT	3	0	1.1	0.6	0.5	1.6	1.1	0.3
LENGTH	3	0	7.1	4.6	1.8	9.9	8.1	20.8
WIDTH	3	0	8.1	2.0	5.9	9.8	3.9	4.0
THK	3	0	8.2	2.0	5.9	9.7	3.8	4.0
				Bead Preform				
WEIGHT	3	0	1.8	0.6	1.3	2.4	1.1	0.3
LENGTH	3	0	14.9	3.4	11.4	18.1	6.7	11.3
WIDTH	3	0	11.6	2.7	9.9	14.7	4.8	7.1
THK	3	0	6.0	1.4	4.5	7.3	2.8	2.0
				Muller/Hammerstone				
WEIGHT	1	0	338.0	-	338.0	338.0	0	-
LENGTH	1	0	70.6	-	70.6	70.6	0	-
WIDTH	1	0	63.4	-	63.4	63.4	0	-
THK	1	0	46.8	-	46.8	46.8	0	-
				Anvilstone/Chopper				
WEIGHT	1	0	387.3	-	387.3	387.3	0	-
LENGTH	1	0	91.3	-	91.3	91.3	0	-
WIDTH	1	0	70.1	-	70.1	70.1	0	-
THK	1	0	47.6	-	47.6	47.6	0	-
				Mortar/Anvilstone				
WEIGHT	1	0	1029.1	-	1029.1	1029.1	0	-
LENGTH	1	0	156.0	-	156.0	156.0	0	-
WIDTH	1	0	109.3	-	109.3	109.3	0	-
THK	1	0	32.3	-	32.3	32.3	0	-
				Mortar/Pitted Anvilstone				
WEIGHT	1	0	249.1	-	249.1	249.1	0	-
LENGTH	1	0	88.6	-	88.6	88.6	0	-
WIDTH	1	0	65.4	-	65.4	65.4	0	-
THK	1	0	33.0	-	33.0	33.0	0	-

VARIABLE	N	N MISS	MEAN	SD	MIN VALUE	MAX VALUE	RANGE	VARIANCE
			Pitted Anvilstone/Abrader					
WEIGHT	2	0	307.3	205.5	162.0	452.6	290.6	42224.2
LENGTH	2	0	85.3	27.9	65.5	105.0	39.5	780.1
WIDTH	2	0	57.2	11.3	49.2	65.2	16.0	128.0
THK	2	0	39.7	1.2	38.9	40.6	1.7	1.4
			Grooved Abrader/Hammerstone/Pitted Anvilstone					
WEIGHT	1	0	1152.5	-	1152.5	1152.5	0	-
LENGTH	1	0	165.0	-	165.0	165.0	0	-
WIDTH	1	0	78.0	-	78.0	78.0	0	-
THK	1	0	55.1	-	55.1	55.1	0	-
			Awl					
WEIGHT	2	0	0.2	0.2	0.1	0.4	0.3	0.0
LENGTH	2	0	27.6	3.7	25.0	30.2	5.2	13.5
WIDTH	2	0	2.6	0.6	2.2	3.0	0.8	0.3
THK	2	0	2.7	0.8	2.2	3.3	1.1	0.6

Table 5.24. Site 22IT539: Distribution of Historic Material from General Surface Collection, Test Units, and Features.

Materials Description	General Surface Collect	Test Units 102S 87W L1	102S 87W L2	118S 103W L1	130S 121W L17	Features No 17[	No 34	Total
Salt Glaze Stoneware	5	-	-	-	-	-	-	5
Truck Lug Bolt	1	-	-	-	-	-	-	1
Wire Nail	-	1	-	1	3	-	-	5
Circular Saw Tooth	-	14	-	-	-	1	-	15
Unid Sheet Metal Fragment	-	-	-	-	5	-	-	5
Zipper-pull and Closure Mechanism	-	-	1	-	-	-	-	1
Tin Can Fragment	-	-	-	-	-	-	1	1
Total	6	15	1	1	8	1	1	33

[Level 17 was the number assigned to the material found during cleanup of 130S/121W (the original test unit, dug by testing project crew). It contains material from Levels 1-17, not just Level 17.

Table 5.25. Site 22IT539: Distribution of Historic Material in Blocks A and B.

Block A

Materials Description	128S 88W L1	128S 90W L1	128S 90W L2	130S 90W L1	130S 90W L9	Total
Wire Nail	-	7	3	4	-	14
12 Gauge Shell Casing	1	1	1	-	-	3
Pink-tinted Sheet Plastic	-	-	-	-	2	2
Total	1	8	4	4	2	19

Block B

Materials Description	140S 102W L1	140S 104W L1	142S 102W L1	146S 102W L1	146S 102W L2	146S 104W L1	Total
Circular Saw Tooth	3	-	-	-	-	-	3
Circular Saw Collar	1	-	-	-	-	-	1
Bolt (Iron/Steel)	1	-	-	-	-	-	1
Unid Wire Frag (Iron/Steel)	1	-	-	-	-	-	1
Wire Nail	-	-	1	-	1	-	2
6" Slip-joint Pliers	-	-	-	-	-	1	1
Sheet Metal Fragment (Tin Can)	-	4	-	-	-	-	4
.32 Caliber Shell Casing	-	-	-	1	-	-	1
Unid Clear Sheet Plastic Fragment	-	-	1	-	-	-	1
Total	6	4	2	1	1	1	15

	CERAMIC			GLASS		METAL															MISCELLANEOUS						
	Lead Glaze Stoneware	Salt Glaze Stoneware	White Ware (Hard-paste earthen ware)	Unid. Clear Glass Frag.	Unid. Blue-Green Glass Frag.	Wire Nail	Square Cut Nail	Horseshoe Nail	Hexagonal Nut	Lock Nut (Iron/Steel)	Washer (Iron/Steel)	Tin Can Frag.	Unid. Metal Frag. (Iron/Steel)	Unid. Sheet Metal Frag. (Iron/Steel)	Unid. Wire Frag. (Iron/Steel)	Tin Can Frag. Bail Attachment	Rolled Sheet Metal Tube (sleeve)	Strap Metal	Circular Saw Tooth	Stamped Metal Cleat	.22 Shell Casing	.22 Slug	12 Gauge Shell Casing	16 Gauge Shell Casing	Tar	Coal	TOTAL
96S, 122W L.3									1		1			4							3						9
96S, 126W L.3						1																					1
96S, 128W L.3	1			1																	1						3
96S 132W L.3																	1										1
98S, 122W L.3						1																					1
98S, 124W L.2					1																						1
98S, 126W L.2		1				2																					3
98S, 126W L.3										1																	1
98S, 128W L.3	5					4						8			1												18
98S, 130W L.3	2																	1							2	6	11
98S, 132W L.3															2						1	1					4
100S, 122W L.3										1																	1
100S, 124W L.3						1			1												1						3
100S 126W L.3				1			1																				2
100S 128W L.2	1																										1
100S 128W L.3																			1								1
100S 130W L.2																					1						1
100S, 130W L.3								1																			1
102S, 122W L.3																				1							1
102S 126W L.2															1								1				2
102S 126W L.3	1																							1			2
102S, 128W L.1						2								2													4
102S 128W L.2																					1						1
102S 130W L.1													1						1								2
104S, 122W L.2		1				1							1								1						4
104S, 124W L.3			1																								1
104S, 126W L.2						1						1															2
104S, 128W L.2																					1						1
104S 130W L.2																					1						1
104S 130W L.3						1																					1
106S 122W L.2													2	2													4
106S, 124W L.2				1		1									1						1						4
106S, 128W L.1	1					1						5															7
106S 128W L.2														2													2
106S [illegible] L.1												22				1											23
106S, 132W L.1												8															3
TOTAL	11	2	1	3	1	16	1	1	2	2	1	44	4	10	5	1	1	1	2	1	12	1	1	1	2	6	133

Table 5.26. Site 22IT539. Distribution of Historic Material in Blocks A and B.

SAMPLE			ANALYSIS DATA					
ID	PROVENIENCE	VOLUME (l)	TOTAL FLORA WT.[a] (g)	HICKORY NUT *Carya* spp.[c] (g)	ACORN *Quercus* spp.[c] (g)	SEED	WOOD[f] (g)	OTHER
	BLOCK A: UNIT: 128S/88W							
1450C	Lev. 3 (88.80)	2.00	1.30	~1.30	<0.05	3 fern spores	0.25 indeterminate wood, phellem, and resin	
1572C	Lev. 7 (88.40)	2.20	2.10	1.90			0.15 indeterminate wood, pine and resin	
2867C	Lev. 9 (88.20) Seg. A	1.60	4.00	3.50			0.10 pine and oak (*Quercus*)	
3279C	Lev. 12 (87.90)	1.20	9.70	9.50			0.20 indeterminate wood and resin	1 indeterminate
4591C	Lev. 16 (87.50)	1.50	1.55	1.45				
	BLOCK B: UNIT: 142S/100W							
1485C	Lev. 6 (88.40) Sublev. 1	3.00		20.10[d]	(7)[e] husk frags.	1 pokeweed (*Phytolacca*)	0.20 pine and resin	
1497C	Lev. 6 (88.35) Sublev. 2	2.00		16.30[d]	(2) husk frags.		0.20 indeterminate wood	19 concretions
1626C	Lev. 7 (88.30) Sublev. 1	2.00		17.85			0.20 indeterminate wood	
	FEATURE 5							
1476C	W? (88.65)	2.00						No botanical remains

Table 5,27. Site 22IT539: Summary of Analyzed Botanical Remains

SAMPLE			ANALYSIS DATA					
ID	PROVENIENCE	VOLUME (l)	TOTAL FLORA WT.[a] (g)	HICKORY NUT *Carya* spp.[c] (g)	ACORN *Quercus* spp.[c] (g)	SEED	WOOD[f] (g)	OTHER
1480C	E½ (88.85 m)	2.00		(12)[e]0.40	(1)[e]	1 spore, gall? 18 fern spores?	(2)[e] <0.05 indeterminate wood	1 modern indeterminate 1 concretion 14 frags. weevil infested gall? aggregate fruit? nut? 11 fruitskins? 23 epidermal frags.
3108C	FEATURE 6 E½ (88.54 m) ST. 1	1.00	<1.00	1.05	< 0.05		<0.05 pine and ring-porous hardwood	
3114C	E½ (88.32 m) ST. 2	1.00	2.55	1.70			<0.05 indeterminate wood and resin	
3158C	E½ (88.35 m) ST. 4	2.00	6.75	6.60			<0.05 all resin	
3160C	E½ (88.35 m) ST. 4	2.00	3.55	2.35			0.20 indeterminate wood <0.05 all resin	
3159C	E½ (88.31 m) ST. 4	2.00	3.35	2.25			<0.05 indeterminate wood and resin	
1564C	FEATURE 9 S½ (88.40 m)	2.00		3.60	(1) husk frags.		0.50 indeterminate wood	
1645C	S½ (88.30 m)	2.00		6.05[d]			0.20 conifer	5 concretions
1703C	S½ (88.30 m)	2.00		4.70[d]			0.20 pine and resin	

Table 5.27. Site 22IT539: Summary of Analyzed Botanical Remains (cont.)

SAMPLE			ANALYSIS DATA					
ID	PROVENIENCE	VOLUME (l)	TOTAL FLORA WT.[a] (g)	HICKORY NUT *Carya* spp.[c] (g)	ACORN *Quercus* spp.[c] (g)	SEED	WOOD[f] (g)	OTHER
1616C	N½ (88.40↘)	2.00		4.10[d]			0.25 indeterminate wood	3 concretions
1648C	N½ (88.30↘)	2.00		8.35[d]			0.20 ring-porous hardwood	11 concretions
1706C	FEATURE 9 N½ (88.30↘)	1.50		6.15[d]		1 modern grass (Poaceae)	0.15 pine and resin	4 concretions
2973C	FEATURE 73 S½ (88.19↘) ST. 1	3.00	5.45	5.40			0.05 indeterminate wood	
2976C	S½ (88.30↘) ST. 2	7.20	49.05	48.80		1 pokeweed (*Phytolacca*) 1 hackberry (*Celtis*)	0.10 ring-porous hardwood 0.05 resin	
2917C	N½ (88.30↘) ST. 2	11.00	104.85	103.00			0.20 ring-porous hardwood	
3453C	FEATURE 93 W½ (87.62↘) ST. 1	3.80	31.10	29.95	(4) frags?	1 obovate 1 pericarp	0.35 ring-porous hardwood and pine	1 fruit frag.
3455C	W½ (87.62↘) ST. 2	6.00	9.80	9.60			0.10 ring-porous hardwood and pine	
3471C	FEATURE 94 W½ (87.60↘) ST. 1	1.20	63.00	61.70			0.20 pine and resin	

Table 5.27. Site 22IT539: Summary of Analyzed Botanical Remains (cont.)

SAMPLE			ANALYSIS DATA					
ID	PROVENIENCE	VOLUME (l)	TOTAL FLORA WT.[a] (g)	HICKORY NUT *Carya* spp.[c] (g)	ACORN *Quercus* spp.[c] (g)	SEED	WOOD[f] (g)	OTHER
3487C	E½ (87.60↘)	1.00	22.60	27.80		1 fern spore	~0.10 pine	1 indeterminate
3547C	FEATURE 95 SE½ (87.74↘) ST. 2	8.00	13.90	13.05			0.05 ring-porous hardwood and pine	4 husk frags.? 1 indeterminate
3548C	SE½ (87.65↘) ST. 3	0.50	0.70	0.70			(6) <0.05 ring-porous hardwood frags.	
3500C	NW½ (87.65↘) ST. 3	0.20	0.06	0.06				
3551C	SE½ (87.62↘) ST. 4	2.40	4.05	4.00	(6) 0.05		<0.05 indeterminate wood	
5058C	FEATURE 95 (87.73↘) ST. 5	6.00	3.52	3.10	(1) <0.05		(9) <0.05 indeterminate wood	
5246C	FEATURE 117 (88.34↘)	13.00	42.20	35.10		1 seed coat, poss. persimmon (*Diospyros*)	4.95 ring-porous hardwood, pine and sweet gum (*Liquidambar*) 0.60 cane (*Arundinaria*)	
5476C	FEATURE 120 (88.22↘) ST. 2	26.00	89.10	71.70	0.10	0.15 grams walnut frags. (*Juglans*) 1 fern spore 1 persimmon seed (*Diospyros*)	0.75 diffuse-porous hardwood	

Table 5.27. Site 22IT539: Summary of Analyzed Botanical Remains (cont.)

SAMPLE			ANALYSIS DATA					
ID	PROVENIENCE	VOLUME (l)	TOTAL FLORA WT.[a] (g)	HICKORY NUT *Carya* spp.[c] (g)	ACORN *Quercus* spp.[c] (g)	SEED	WOOD[f] (g)	OTHER
5643C	FEATURE 120 (88.36%) ST. 10	4.00	15.00	14.85		2 indeterminate seed frags.	0.15 indeterminate wood	
6009C	FEATURE 142 E½ (87.21%) ST. 4	2.00	39.40	39.15			0.30 hardwood	
6046C	E½ (86.96%) ST. 11	24.00	2129.50[b]	213.40	(1)	1 grape seed (*Vitis*) 1 persimmon frag. (*Diospyros*)	0.30 indeterminate wood	
6066C	E½ (86.79%) ST. 15	6.00	82.70	79.60	0.10		1.85 hardwood and pine	

[a]Total carbonized botanical weight.

[b]Only 10% of the total sample was analyzed.

[c]All the carbonized botanical remains under the acorn and hickory columns are pericarp fragments unless otherwise specified.

[d]Mixed with some modern detritus.

[e]Numbers inside parenthesis under columns (whose weight is denoted by grams) indicate actual botanical count.

[f]Material listed under the wood column is not the actual total of wood recovered; it is mixed with other materials.

Table 5.27. Site 22IT539: Summary of Analyzed Botanical Remains (cont.)

Table 5.28. Site 22IT539: Inventory of Faunal Remains.

Mammal
- Opossum (*Didelphis marsupialis*)
- Eastern Cottontail (*Sylvilagus floridanus*)
- cf. Woodchuck (*Marmota monax*)
- Squirrel (*Sciurus* sp.)
- Mouse sp.
- Canid (Canidae)
- cf. Raccoon (*Procyon lotor*)
- cf. Elk (*Cervus canadensis*)
- White-tailed Deer (*Odocoileus virginianus*)
- Elk/Bison (*Cervus/Bison*)
- Pig (*Sus scrofa*)
- Antler (Cervidae)
- Indeterminate Mammal Bone

Bird
- Turkey (*Meleagris gallopavo*)
- Passerine sp.
- Indeterminate Bird Bone

Reptile
- Snapping Turtle (*Chelydra serpentina*)
- Mud/Musk Turtle (Kinosternidae)
- Eastern Box Turtle (*Terrapene carolina*)
- Slider/Map/Painted Turtle (*Pseudemys/Graptemys/Chrysemys*)
- Softshell Turtle (*Trionyx* sp.)
- Nonpoisonous Snakes (Colubridae)
- Poisonous Snakes (Viperidae)
- Turtle sp.

Fish
- Bowfin (*Amia calva*)
- Catfish (Ictaluridae)
- Indeterminate Fish Bone

Table 5.29. Site 22IT539: Distribution of Faunal Remains in Block A.

0.25 Inch

Fauna	Levels *															
	1	2	9	10	11	12	13	14	15	16	17	18	19	24	25	Total
Antler	-	-	-	2	-	-	-	1	1	-	-	-	-	-	-	4
Ind Mammal	1	-	-	2	44	13	6	23	22	9	4	-	1	-	2	127
Ind Bird	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
Eastern Box Turtle	-	-	-	-	-	-	1	-	1	2	-	-	-	-	-	4
Slider/Map/ Paint Turtle	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Nonpoisonous Snakes	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Turtle sp.	-	-	-	-	1	-	1	4	9	3	1	-	-	-	-	19
Total	2	1	-	4	45	14	8	28	33	14	7	-	1	-	2	159

0.125 Inch

Fauna	1	2	9	10	11	12	13	14	15	16	17	18	19	24	25	Total
Ind Mammal	-	-	2	25	124	-	193	525	278	-	160	14	-	1	2	1324
Ind Bird	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Turtle sp.	-	-	-	-	-	-	2	3	3	-	-	-	-	-	-	8
Catfish	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Ind Fish	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	2
Total	-	-	2	25	124	-	196	528	283	-	161	14	-	1	2	1336

* Component/Level Correlation is as follows:
Mixed/1 - 4
Benton/5 - 9
Sykes-White Springs/10 - 13
Eva-Morrow Mountain/14 - 17
Kirk/18 - 20

Table 5.30. Site 22IT539: Distribution of Faunal Remains in Block B.

0.25 Inch

Fauna	Levels 1	2	3	4	7-1	7-2	8	9	10	Total
Opossum	4	-	-	-	-	-	-	-	-	4
Elk	1	-	-	-	-	-	-	-	-	1
Ind Mammal	1	4	1	6	4	1	4	6	47	74
Ind Bird	1	-	-	-	-	-	-	-	-	1
Eastern Box Turtle	-	-	-	-	-	-	-	-	5	5
Turtle sp.	-	-	-	-	-	-	1	-	1	2
Bowfin	3	-	-	-	-	-	-	-	-	3
Total	10	4	1	6	4	1	5	6	53	90

Table 5.31. Site 22IT539: Distribution of Faunal Remains in Block C.

0.25 Inch

Fauna	Levels 1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Woodchuck	-	-	-	-	-	-	-	-	-	-	-	2	-	2
Raccoon	-	-	-	-	-	-	-	-	-	-	-	1	-	1
White-Tailed Deer	-	1	1	1	-	-	1	-	2	-	-	3	3	12
Pig	-	1	1	-	-	-	-	-	-	-	-	-	-	2
Antler	-	1	1	-	-	-	-	-	-	-	1	3	-	6
Ind Mammal	1	24	51	21	4	4	6	15	24	38	111	536	346	1181
Turkey	-	-	-	-	-	-	-	-	-	-	-	-	3	3
Ind Bird	-	-	-	-		-	-	-	-	-	4	8	10	22
Snapping Turtle	-	-	-	-	-	-	-	-	-	-	-	-	2	2
Mud/Musk Turtle	-	-	1	-	-	-		-	-	-	-	2	2	5
Eastern Box Turtle	-	2	4	4	-	-	-	-	-	-	3	4	10	27
Slider/Map/Painted Turtle	-	-	-	-	-	-	-	-	-	1	3	3	-	7
Softshell Turtle	-	-	-	-	-	-	-	1	-	-	-	8	-	9
Nonpoisonous Snakes	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Poisonous Snakes	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Turtle sp.	-	-	8	-	-	-	-	-	1	5	16	38	30	98
Ind Fish	-	-	-	-	-	-	-	-	-	-	-	2	-	2
Total	1	29	68	26	4	4	7	16	27	44	138	611	406	1381

0.125 Inch

Fauna	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Ind Mammal	-	-	-	-	-	-	-	-	-	18	94	194	426	732
Ind Bird	-	-	-	-	-	-	-	-	-	-	-	-	3	3
Eastern Box Turtle	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Turtle sp.	-	-	-	-	-	-	-	-	-	-	-	-	4	4
Total	-	-	-	-	-	-	-	-	-	18	95	194	433	740

Table 5.32. Site 22IT539: Distribution of Faunal Remains in Block D.

0.25 Inch

Fauna	Levels 10	11	12	13	14	15	16	17	18	19	Total
Eastern Cottontail	-	-	-	-	1	-	-	-	-	-	1
White-Tailed Deer	-	-	-	-	1	-	1	-	-	-	2
Ind Mammal	-	5	1	23	60	28	40	12	-	1	170
Ind Bird	-	-	-	-	-	1	-	-	-	-	1
Eastern Box Turtle	-	-	-	1	1	-	-	-	-	-	2
Nonpoisonous Snake	2	1	-	-	-	-	-	-	-	-	3
Turtle sp.	-	-	2	-	-	2	2	4	1	-	11
Total	2	6	3	24	63	31	43	16	1	1	190

0.125 Inch

Fauna	10	11	12	13	14	15	16	17	18	19	Total
Ind Mammal	-	-	-	-	-	43	10	3	-	-	56
Total	-	-	-	-	-	43	10	3	-	-	56

Table 5.33. Site 22IT539: Distribution of Faunal Remains in Test Units.

0.25 Inch

Fauna	102S/87W Levels										118S 103W	130S 121W
	2	5	7	9	11	12	13	14	15	Total	L4	L18
White-Tailed Deer	-	-	-	-	-	-	-	1	-	1	-	-
Antler	1	-	-	-	-	-	-	-	-	1	-	-
Ind Mammal	-	1	7	-	4	5	3	5	1	26	-	-
Turkey	-	-	-	-	-	1	-	-	-	1	-	-
Eastern Box Turtle	-	-	-	1	-	1	-	-	-	2	-	1
Softshell Turtle	-	-	-	-	-	-	-	1	-	1	-	-
Turtle sp.	-	-	-	-	-	-	1	-	1	2	-	5
Nonpoisonous Snake	-	-	-	-	-	-	-	-	-	-	1	-
Total	1	1	7	1	4	7	4	7	2	34	1	6

0.125 Inch

Fauna	102S/87W Levels				
	14	15	16	17	Total
Squirrel	-	1	-	-	1
Mouse sp.	-	-	2	-	2
Ind Mammal	7028	2419	352	46	9845
Passerine sp.	-	1	-	-	1
Ind Bird	39	15	4	5	63
Nonpoisonous Snake	3	-	-	-	3
Turtle sp.	9	5	-	-	14
Bowfin	2	6	-	-	8
Catfish	1	-	-	-	1
Ind Fish	19	17	3	-	39
Total	7071	2464	361	51	9977

Table 5.33. Site 22IT539: Distribution of Faunal Remains in Test Units (cont.).

0.25 Inch

Fauna	122S/146W Levels						146S/69W Levels						
	5	6	7	10	14	Total	1	7	8	9	10	11	Total
White-Tailed Deer	-	-	-	-	-	-	-	-	-	1	-	-	1
Ind Mammal	1	1	1	1	1	5	-	1	-	2	2	5	10
Eastern Box Turtle	-	-	-	-	-	-	-	-	-	1	-	-	1
Slider/Map/Painted Turtle	-	-	-	1	-	1	-	-	-	-	-	-	-
Nonpoisonous Snake	-	-	-	-	-	-	3	1	1	-	-	-	5
Turtle sp.	-	-	-	3	-	3	-	-	-	1	-	-	1
Total	1	1	1	5	1	9	3	2	1	5	2	5	18

FEATURE	4	6	1	37	41	45	49	73	77	89	97	107	120	125	128	142	146	148	151	154	156	161	Total
1/4 Inch																							
Canid											1												1
White-Tailed Deer									1		1					1							3
Elk/Bison										1													1
Indeterminate Mammal	1			1	3		4		14	19	5	101	9	42	1	39	5	81	16	3	1		345
Eastern Box Turtle			1			1																	2
Turtle sp.										1						3		1			2	1	8
TOTAL	1		1	1	3	1	4		15	21	7	101	9	42	1	43	5	82	16	3	3	1	360
1/16 Inch																							
Indeterminate Mammal		1						1															2
TOTAL		1						1															2

Table 5.24. Site 22IT539: Distribution of Faunal Remains in Features

Table 5.35. Site 22IT539: Volumes and Correction Factors By Levels, Blocks A, B, C, and D.

Level	Number of Units [1] Excavated	Volume in Cubic Meters of Units Excavated	Correction Factor [2]
1	26	10.4	1.54
2	35	14.0	1.05
3	49 [3]	19.6	0.82
4	40	16.0	1.00
5	40	16.0	1.00
6	40	16.0	1.00
7	40	16.0	1.00
8	40	16.0	1.00
9	33	13.2	1.21
10	37	14.8	1.08
11	33	13.2	1.21
12	33	13.2	1.21
13	22	8.8	1.82
14	8	3.2	5.00
15	16	6.4	2.50
16	16	6.4	2.50
17	16	6.4	2.50
18	16	6.4	2.50
19	16	6.4	2.50
20	12	4.8	3.33
21	6	2.4	6.66
22	4	1.6	10.00

[1] Unit equals 2 by 2 m by 10 cm (0.4 cubic meter).

[2] The Correction Factor is the quotient of 40 divided by N, where 40 is the most frequent highest number of units excavated and N is the actual number of units excavated.

[3] This high number of units is due to those in Unit C which were reduced to 10 by 10 m in Level 4.

Projectile Point/Knife Type	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12	Level 13	Level 14	Level 15	Level 16	Level 17	Level 18	Level 19	Level 20	Total
Wild Mass Tri	34	23	9	2	2																70
Small Madison Tri	1	6	2	1		1															11
Bradley Spike		1		1																	2
Ledbetter/Pickwick		2	1	1		2															6
Mud Creek	1	1	1																		3
Flint Creek	1	1	1	1																	4
Little Bear Creek	1	16	2	4	2		1			1	1										11
Elora		1																			1
Gary			2	1																	3
McIntire			1																		1
Savannah River		1																			1
Residual Stemmed	1	6	6	2	5	3	7	9	2	5	7	4	5	1	1		1				65
Benton Barbed		1			1	1	1	6	2												12
Benton Short Stem		3		11	9	23	11	21	11	12	10	8	6	1							126
Benton Extended		3	6	4	8	11	9	6				4									47
Crawford Creek						1					1		1		1	2	1				7
Lee						1	1						1		1						4
Morrow Mtn Rd Base							1									1					2
Morrow Mountain				1							2	1		1	1	1					9
Morrow Mtn Str Base								2		2	1				3	2	2				12
Sykes White Springs	1	2	1	2		2	1	3	6	12	12	6	15	2	1	1					76
Vaughn		1				1	1														3
Residual Tri				1		1		2		1		1			1						7
Cypress Creek		1								1	1		1	2	3	1					11
Kirk Corner Notched			1							1					1	1		1		1	8
MacCorkle Stemmed													1								1
Big Sandy							1	1		1											3
Dalton						1		1													2
Total	[illegible]	64	42	32	27	48	36	53	21	41	35	22	32	7	15	9	4	1		1	536

Table 5.36 Site 22IT539: Projectile Point/Knive Distributions in Blocks A,B,C, and D (raw Counts)

PROJECTILE POINT/ KNIFE TYPE	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12	Level 13	Level 14	Level 15	Level 16	Level 17	Level 18	Level 19	Level 20	Total
[illegible]	52	26	7	2	2																87
Small [illegible]	5	6	2	1																	14
Bradley Spike		1		1		1															3
Ledbetter/Pickwick		2	1	1																	4
Mud Creek	2	1	1			2															6
Flint Creek	2	1	2	1																	6
Little Bear Creek	5	15	6	4	2		1			1	1										35
Elora		1																			1
Gary			2	1																	3
McIntire			1																		1
Savannah River		1																			1
Residual Stemmed	2	4	5	2	5	3	7	9	2	6	8	5	9	5	7		2				81
Benton Barbed		1	-		1	1	1	6	2												12
Benton Short Stem		1		11	9	23	11	21	13	14	12	10	11	5							143
Benton Extended		1	5	4	8	11	9	6													46
Crawford Creek						1					1		2		2	5	2				13
Eva						1	1						2		2						6
Morrow Mtn Rd Base				1			1									2					4
Morrow Mountain											2	4		5	2	2					15
Morrow Mtn Str Base								2		2	1				7	5	4				21
Sykes White Springs	2	2	2	2		2	1	1	2	20	16	7	27	10	2	2					105
Vaughn		1				1	1														3
Residual [illegible]				1		1		2		1		1			2						8
Cypress Creek		1								1	1		5	10	7	2					26
Kirk Corner Nt.			1							1					1	2		7		2	14
[illegible] Stemmed													2								2
Big Sandy							1	1		1											3
[illegible]						1		1													2
Total	70	66	35	32	27	48	36	[illegible]	24	47	40	27	58	35	12	20	8	7	0	2	665

Table 5.37. Site 22IT539: Projectile Point/Knife Distributions in Blocks A,B,C, and D: Corrected

PROJECTILE POINT/KNIFE TYPE	Level 1	Level 2	Level 3	Level 4	Leve. 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12	Level 13	Level 14	Level 15	Level 16	Level 17	Level 18	Level 15	Level 20
Late Woodland/Miss. Triang.	72(74)	36(30)	21(20)	6(6)	7(7)															
Small Triangular	7(7)	9(9)	5(6)	3(3)		2(2)														
Bradley Spike		2(1)		3(3)																
Ledbetter/Pickwick		3(3)	2(3)	3(3)		4(4)														
Mud Creek	2(3)	2(1)	2(3)																	
Flint Creek	2(3)	2(1)	7(6)	3(3)																
Little Bear Creek	2(2)	22(22)	17(17)	12(12)	7(7)		3(3)			2(2)	3(2)									
Elora		2(1)																		
Gary			5(6)	3(3)																
McIntire			2(3)																	
Savannah River		2(1)																		
Residual Stemmed	1(1)	6(6)	16(16)	6(6)	18(18)	6(6)	19(19)	18(18)	9(8)	12(13)	20(20)	18(18)	16(15)	14(14)	20(22)		25(25)			
Benton Barbed		2(1)			6(6)	2(2)	3(3)	12(12)	9(8)											
Benton Short Stemmed		5(4)		36(36)	33(33)	49(49)	30(30)	41(41)	52(54)	29(30)	29(30)	36(37)	19(19)	14(14)						
Benton Extended Stemmed		5(6)	16(16)	12(12)	30(30)	23(23)	25(25)	12(12)												
Crawford Creek						2(2)					3(2)		3(3)		7(6)	27(25)	25(25)			
Eva						2(2)	3(3)						3(3)		7(6)					
Morrow Mt. Rounded Base							3(3)									11(10)				
Morrow Mountain				3(3)							6(5)	14(15)		14(14)	7(6)	11(10)				
Morrow Mt. Straight Base								4(4)		5(6)	3(2)				20(22)	22(22)	50(50)			
Sykes-White Springs	1(1)	3(3)	7(6)	6(6)		4(4)	8(8)	6(6)	29(29)	41(43)	34(35)	27(26)	47(46)	28(28)	7(6)	11(10)				
Vaughn		2(1)				2(2)	3(3)													
Residual Triangular				3(3)		2(2)		4(4)		2(2)		4(4)			7(6)	11(10)				
Cypress Creek										2(2)	3(2)		9(9)	28(28)	20(22)	11(10)				
Kirk Corner Notched			2(1)							2(2)					7(6)			100(100)		100(100)
McCorkle Stemmed													3(3)							
Big Sandy							3(3)	2(2)		2(2)										
Dalton						2(2)		2(2)												
Total	97	102	98	97	99	100	100	101	99	97	101	99	100	98	102	99	100	100	0	100

Table 5.38. Site 22IT539: Percentage of Projectile Point/Knife Distributions in Blocks A,B,C, and D by Level, Uncorrected and (Corrected)

Table 5.39. Site 22IT539: Radiocarbon Determinations.

Lab. No. DIC-1955 Field No. 539-1446

T1/2 5568: 4460 ± 95
T1/2 5730: 4594 ± 95
Calendric date (uncorrected; T1/2 5730): 2644 B.C.
(corrected; T1/2 5730 MASCA): 2980-3010 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Blk A, 128.25S/88.25W, L. 3, (88.80-88.70)
Comments: Mixed general level fill. Date probably reflects the substantial Late Archaic occupation of the site.

Lab. No. DIC-1954 Field No. 539-1568

T1/2 5568: 5540 ± 75
T1/2 5730: 5706 ± 75
Calendric date (uncorrected; T1/2 5730): 3756 B.C.
(corrected; T1/2 5730 MASCA): 4440 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Blk A, 128.25S/88.25W, L. 7, (88.40-88.30)
Comments: Cultural affiliation is probably Benton.

Lab. No. DIC-2006 Field No. 539-2939

T1/2 5568: 5180 ± 75
T1/2 5730: 5335 ± 75
Calendric date (uncorrected; T1/2 5730): 3385 B.C.
(corrected; T1/2 5730 MASCA): 4000 B.C.
Sample: Carbonized nuthshells
Provenience: 22IT539, Block B, F-6, S-4, (W 1/2)
Comments: Dates a Benton "prepared area."

Lab. No. DIC-2007 Field No. 539-3069

T1/2 5568: 5330 ± 70
T1/2 5730: 5490 ± 70
Calendric date (uncorrected; T1/2 5730): 3540 B.C.
(corrected; T1/2 5730 MASCA): 4210-4260 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Block B, F-6, S-5, (W 1/2)
Comments: Dates same Benton "prepared area" as DIC 2006 above.

Table 5.39. Site 22IT539:: Radiocarbon Determinations (cont.).

Lab. No. DIC-1953 Field No. 539-3278

T1/2 5568: 5730 ± 115
T1/2 5730: 5902 ± 115
Calendric date (uncorrected; T1/2 5730): 3952 B.C.
(corrected; T1/2 5730 MASCA): 4580 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Blk A, 128.25S/88.25W, L.12, (87.90-87.80)
Comments: Dates a Middle to Late Archaic (Sykes-White Springs/Benton) level.

Lab. No. DIC-1952 Field No. 539-4589

T1/2 5568: 7080 ± 95
T1/2 5730: 7303 ± 95
Calendric date (uncorrected; T1/2 5730): 5353 B.C.
(corrected; T1/2 5730 MASCA): 5930 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Blk A, 128.25S/88.25W, L.16, (87.50-87.40)
Comments: Dates the Middle Archaic Eva-Morrow Mountain Zone (VI).

Lab. No. DIC-1950 Field No. 539-5476

T1/2 5568: 5970 ± 95
T1/2 5730: 6149 ± 95
Calendric date (uncorrected; T1/2 5730): 4199 B.C.
(corrected; T1/2 5730 MASCA): 4920 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Block C, F-120, S-2
Comments: Dates a Middle to Late Archaic "prepared area" (probably Sykes-White Springs).

Lab. No. DIC-2081 Field No. 539-5758

T1/2 5568: 6060 ± 70
T1/2 5730: 6242 ± 70
Calendric date (uncorrected; T1/2 5730): 4292 B.C.
(corrected; T1/2 5730 MASCA): 5010 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Blk D, 114.25S/120.25W, L.17, (87.50-87.40)
Comments: May date a Middle Archaic-Eva-Morrow Mountain occupation.

Table 5.39. Site 22IT539: Radiocarbon Determinations (cont.).

Lab. No. DIC-1951 Field No. 539-6008

T1/2 5568: 5390 ± 155
T1/2 5730: 5552 ± 155
Calendric date (uncorrected; T1/2 5730): 3602 B.C.
(corrected; T1/2 5730 MASCA): 4330-4350 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Block D, F-142, S-4, (E 1/2)
Comments: Dates a Benton pit feature.

Lab. No. DIC-2082 Field No. 539-6095

T1/2 5568: 7250 ± 85
T1/2 5730: 7468 ± 85
Calendric date (uncorrected; T1/2 5730): 5518 B.C.
(corrected; T1/2 5730 MASCA): 6100 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Block D, F-151, 115.5S/105.5W (87.10)
Comments: Dates a probable Eva-Morrow Mountain inhumation.

Lab. No. DIC-2008 Field No. 539-6119

T1/2 5568: 5640 ± 245
T1/2 5730: 5809 ± 245
Calendric date (uncorrected; T1/2 5730): 3859 B.C.
(corrected; T1/2 5730 MASCA): 4500 B.C.
Sample: Carbonized nutshells
Provenience: 22IT539, Block D, F-149, S-3, 116.8S/107.5W
Comments: Appears to be a bad date. Evidence of disturbance and intrusion above and within burial pit. Should have dated a probable Eva-Morrow Mountain burial.

Table 5.40. Site 22IT539: Distribution of Middle Woodland Ceramic Types by Block.

Type	Block A N	Block A %	Block B N	Block B %	Block C N	Block C %
Mulberry Creek Plain	-	-	4	0.50	161	12.05
Flint River Cord Marked	-	-	-	-	71	5.31
Long Branch Fabric Impressed	-	-	-	-	3	0.22
Furrs Cord Marked	6	3.19	64	8.01	97	7.26
Saltillo Fabric Impressed	15	7.98	67	8.39	133	9.96
Residual and Eroded Sand Tempered	167	88.83	664	83.10	871	65.19
Total	188	100.00	799	100.00	1336	100.00

Table 5.41. Site 22IT539: Distribution of Late Woodland and/or Mississippian Ceramic Types by Block.

Type	Block A N	Block A %	Block B N	Block B %	Block C N	Block C %
Decorated Shell	2	1.64	1	0.12	15	1.99
Other Shell	8	6.56	96	11.72	288	38.25
Shell/Grog Tempered	9	7.38	24	2.93	89	11.82
Baytown Plain	40	32.79	207	25.27	176	23.37
Mulberry Creek Cord Marked	28	22.95	288	35.16	73	9.69
Eroded Grog	35	28.69	203	24.79	112	14.87
Total	122	100.00	819	100.00	753	100.00

Table 5.42. Site 22IT539: Eva/Morrow Mountain Component Artifact Distribution.

Class/Type	Block D N	Block D %	Block D % of Class	Block A N	Block A %	Block A % of Class	Total N	Total %	Total % of Class
Biface Production									
Cores	18	72	25	7	28	28	25	100	26
Preform 1	17	94	24	1	6	4	18	100	19
Preform 2	17	68	24	8	32	32	25	100	26
Biface Blades	19	68	27	9	32	36	28	100	29
Total	71	74	100	25	26	100	96	100	100
Other Chipped Stone Tools									
Scrapers	38	75	5	13	25	5	51	100	5
Drills	11	61	2	7	39	2	18	100	2
Knives	8	53	1	7	47	2	15	100	2
Choppers	3	100	1	-	-	-	3	100	§1
Adzes	1	100	1	-	-	-	1	100	§1
Utilized Flakes	463	74	68	159	26	54	622	100	64
Chip Stone Frag	150	58	22	107	42	37	257	100	26
Total	674	70	100	293	30	100	967	100	100
Ground Stone Tools									
Abraders	2	67	2	1	33	2	3	100	2
Hammerstones	6	86	7	1	14	2	7	100	5
Anvilstones	-	-	-	-	-	-	-	-	-
Mullers	1	25	1	3	75	6	4	100	3
Mortars	2	100	2	-	-	-	2	100	1
Polished Stone	1	100	1	-	-	-	1	100	1
Ground Stone Frag	77	63	87	46	37	90	123	100	88
Total	89	64	100	51	36	100	140	100	100
Introduced Rock *									
Sandstone	17,781	70	76	7,581	30	73	25,362	100	75
Fired Clay	3,098	78	13	893	22	9	3,991	100	12
Fire Crack. Chert	2,560	58	11	1,845	42	18	4,405	100	13
Daub	15	100	§1	-	-	-	15	100	§1
Total	23,454	69	100	10,319	31	100	33,773	100	100

* In this tool class N equals the weight measured in grams.

Table 5.43. Site 22IT539: Benton Component Artifact Distribution.

Class/Type	Block B N	Block B %	Block B % of Class	Block C N	Block C %	Block C % of Class	Total N	Total %	Total % of Class
Biface Production									
Cores	5	19	33	21	81	32	26	100	32
Preform 1	1	10	7	9	90	14	10	100	12
Preform 2	3	23	20	10	77	15	13	100	16
Biface Blades	6	19	40	26	81	39	32	100	40
Total	15	19	100	66	81	100	81	100	100
Other Chipped Stone Tools									
Scrapers	5	20	2	20	80	1	25	100	2
Drills	3	7	1	39	93	4	42	100	3
Knives	1	20	1	4	80	1	5	100	§1
Choppers	-	-	-	2	100	1	2	100	§1
Adzes	-	-	-	5	100	1	5	100	§1
Utilized Flakes	86	26	34	245	74	22	331	100	25
Chip Stone Frag	156	17	62	766	83	70	922	100	69
Total	251	19	100	1,081	81	100	1,332	100	100
Ground Stone Tools									
Abraders	-	-	-	5	100	2	5	100	¶1
Hammerstones	1	10	§2	9	90	3	10	100	3
Anvilstones	6	60	9	4	40	¶1	10	100	3
Mullers	1	25	§2	3	75	¶1	4	100	1
Mortars	1	20	§2	4	80	¶1	5	100	¶1
Polished Stone	1	20	§2	4	80	¶1	5	100	¶1
Ground Stone Frag	56	19	85	244	81	89	300	100	88
Total	66	19	100	273	81	100	339	100	100
Introduced Rock *									
Sandstone	19,199	24	84	60,519	76	73	79,718	100	76
Fired Clay	1,686	11	7	13,437	89	16	15,123	100	14
Fire Crack Chert	1,976	20	8	8,030	80	10	10,006	100	9
Daub	19	4	1	520	96	1	539	100	1
Total	22,880	22	100	82,506	78	100	105,386	100	100

*In this tool class N equals the weight measured in grams.

Table 5.44. Site 22IT539: Comparison of Benton and Sykes-White Springs Components.

Class/Type	Benton N	Benton %	Benton % of Class	Sykes-WS N	Sykes-WS %	Sykes-WS % of Class	Total N	Total %	Total % of Class
Biface Production									
Cores	21	37	32	36	63	46	57	100	40
Preform 1	9	53	14	8	47	10	17	100	12
Preform 2	10	56	15	8	44	10	18	100	12
Biface Blades	26	50	39	26	50	34	52	100	36
Total	66	46	100	78	54	100	144	100	100
Other Chipped Stone Tools									
Scrapers	20	48	2	22	52	2	42	100	2
Drills	39	53	3	35	47	3	74	100	3
Knives	4	36	1	7	64	1	11	100	§1
Choppers	2	25	1	6	75	1	8	100	§1
Adzes	5	29	1	12	71	1	17	100	1
Utilized Flakes	245	42	22	339	58	29	584	100	26
Chip Stone Frag	766	51	70	741	49	63	1,507	100	67
Total	1,081	48	100	1,162	52	100	2,243	100	100
Ground Stone Tools									
Abraders	5	62	2	3	38	1	8	100	§2
Hammerstones	9	82	3	2	18	1	11	100	2
Anvilstones	4	57	¶1	3	43	1	7	100	§2
Mullers	3	43	1	4	57	2	7	100	§2
Mortars	4	80	¶1	1	20	1	5	100	1
Polished Stone	4	100	¶1	-	-	-	4	100	§1
Ground Stone Frag	244	55	89	202	45	94	446	100	91
Total	273	56	100	215	44	100	488	100	100
Introduced Rock*									
Sandstone	60,519	65	73	31,997	35	41	92,516	100	58
Fired Clay	13,437	26	16	38,930	74	51	52,367	100	33
Fire Crack Chert	8,030	63	10	4,737	37	6	12,767	100	8
Daub	520	31	1	1,153	69	2	1,673	100	1
Total	82,506	52	100	76,817	48	100	159,323	100	100

* In this tool class N equals the weight measured in grams.

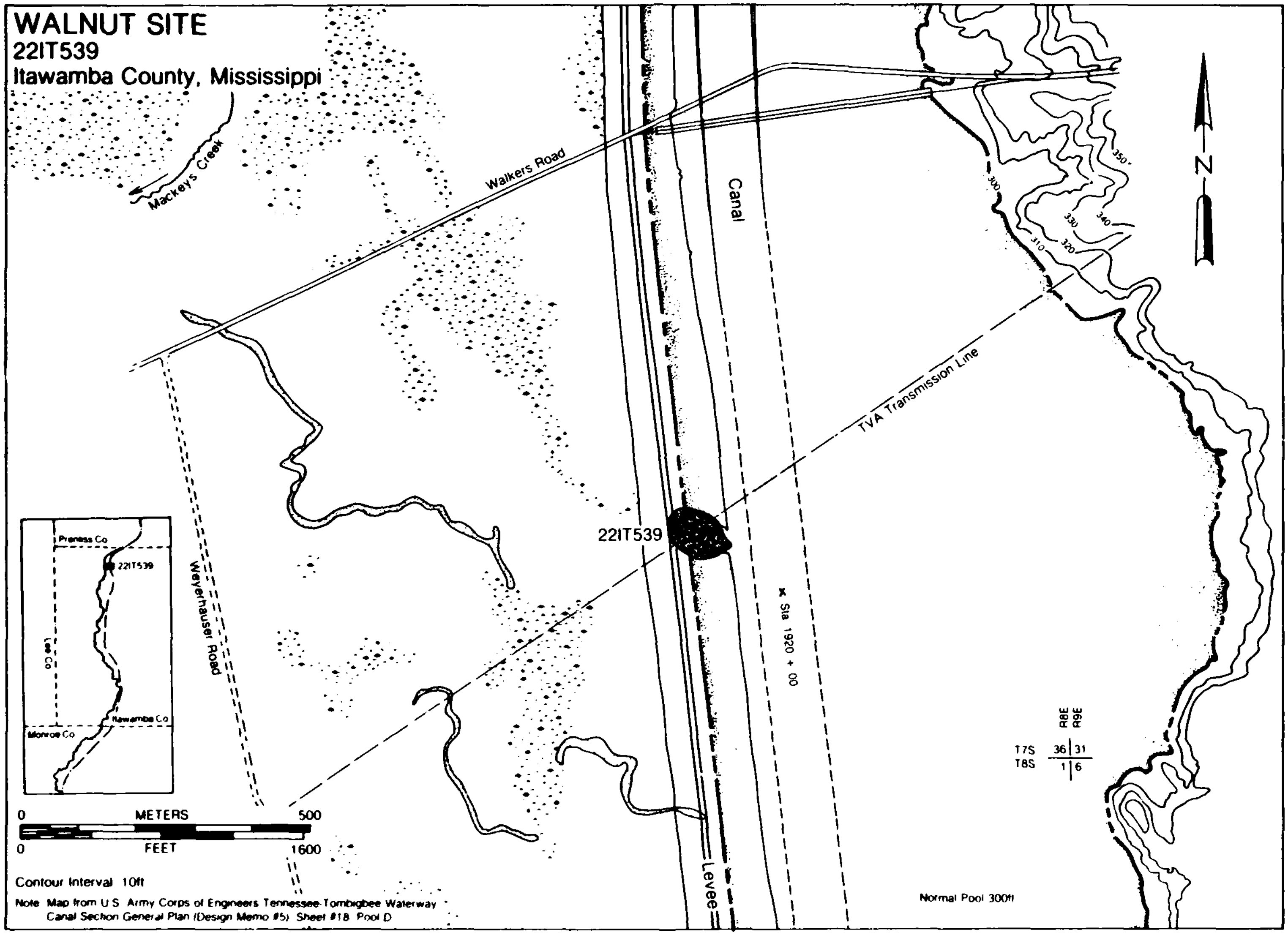
Table 5.45. Site 22IT539: Comparison of Benton and Eva/Morrow Mountain Components.

Class/Type	Benton N	Benton %	Benton % of Class	Eva/Morrow Mtn N	Eva/Morrow Mtn %	Eva/Morrow Mtn % of Class	Total N	Total %	Total % of Class
Biface Production									
Cores	21	49	32	22	51	26	43	100	29
Preform 1	9	32	14	19	68	23	28	100	19
Preform 2	10	31	15	22	69	26	32	100	21
Biface Blades	26	55	39	21	45	25	47	100	31
Total	66	44	100	84	56	100	150	100	100
Other Chipped Stone Tools									
Scrapers	20	28	§2	51	92	6	71	100	4
Drills	39	72	3	15	28	2	54	100	3
Knives	4	24	§1	13	76	2	17	100	1
Choppers	2	40	§1	3	60	§1	5	100	§1
Adzes	5	71	§1	2	29	§1	7	100	§1
Utilized Flakes	245	30	22	569	70	68	814	100	42
Chip Stone Frag	766	81	71	177	19	21	943	100	49
Total	1,081	57	100	830	43	100	1,911	100	100
Ground Stone Tools									
Abraders	5	71	2	2	29	2	7	100	2
Hammerstones	9	53	3	8	47	8	17	100	5
Anvilstones	4	100	¶1	-	-	-	4	100	1
Mullers	3	75	¶1	1	25	1	4	100	1
Mortars	4	67	¶1	2	33	2	6	100	¶1
Polished Stone	4	67	¶1	2	33	2	6	100	¶1
Ground Stone Frag	244	74	89	85	26	85	329	100	88
Total	273	73	100	100	27	100	373	100	100
Introduced Rock *									
Sandstone	23,246	100	76	-	-	-	23,246	100	76
Fired Clay	3,828	100	13	-	-	-	3,828	100	13
Fire Crack Chert	3,271	100	11	-	-	-	3,271	100	11
Daub	15	100	§1	-	-	-	15	100	§1
Total	30,360	100	100	-	-	-	30,360	100	100

*In this tool class N equals the weight measured in grams.

Figure 5.1

Site 22IT539: Site location map



WALNUT SITE
22IT539
Itawamba County, Mississippi
Mackeys Creek
Walkers Road
Weyerhauser Road
Canal
Levee
22IT539
Sta 1920 + 00
TVA Transmission Line
300
310
320
330
340
350
N
R8E R9E
T7S 36 31
T8S 1 6
Prentiss Co
Lee Co
Itawamba Co
Monroe Co
0 METERS 500
0 FEET 1600
Contour Interval 10ft
Note Map from U S Army Corps of Engineers Tennessee-Tombigbee Waterway Canal Section General Plan (Design Memo #5) Sheet #18 Pool D
Normal Pool 300ft

Figure 5.2

Site 22IT539: Topographic map and excavation plan

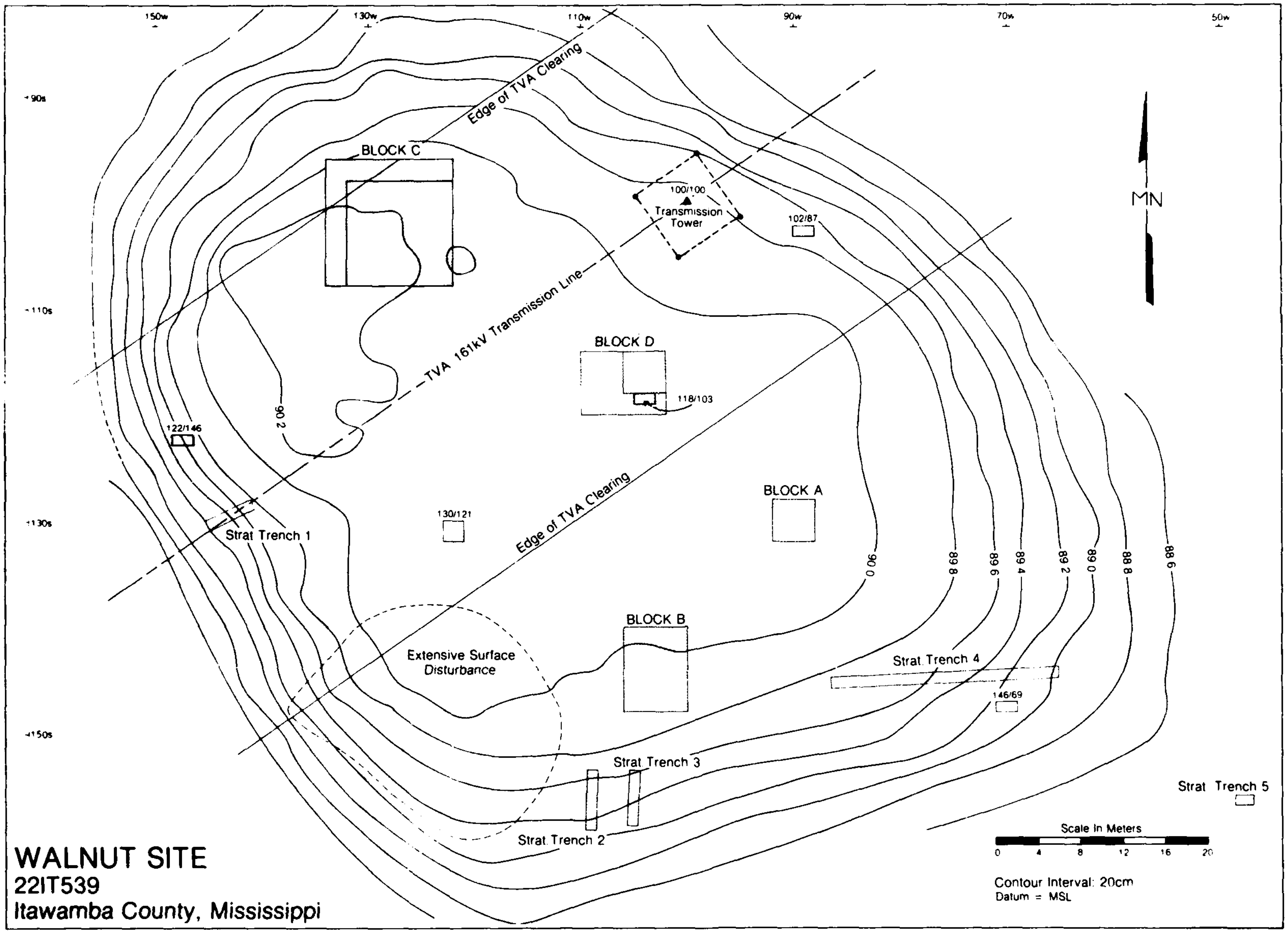

WALNUT SITE
22IT539
Itawamba County, Mississippi
150w
130w
110w
90w
70w
50w
90s
110s
130s
150s
MN
BLOCK A
BLOCK B
BLOCK C
BLOCK D
100/100
Transmission Tower
102/87
118/103
122/146
130/121
146/69
TVA 161kV Transmission Line
Edge of TVA Clearing
Edge of TVA Clearing
Extensive Surface Disturbance
Strat Trench 1
Strat Trench 2
Strat Trench 3
Strat Trench 4
Strat Trench 5
90 2
90 0
89 8
89 6
89 4
89 2
89 0
88 8
88 6
Scale In Meters
0
4
8
12
16
20
Contour Interval: 20cm
Datum = MSL

Figure 5.3

Site 22IT539: Schematic representation of site in Tombigbee floodplain

Schematic Representation of
Site 22IT539 in Tombigbee Floodplain

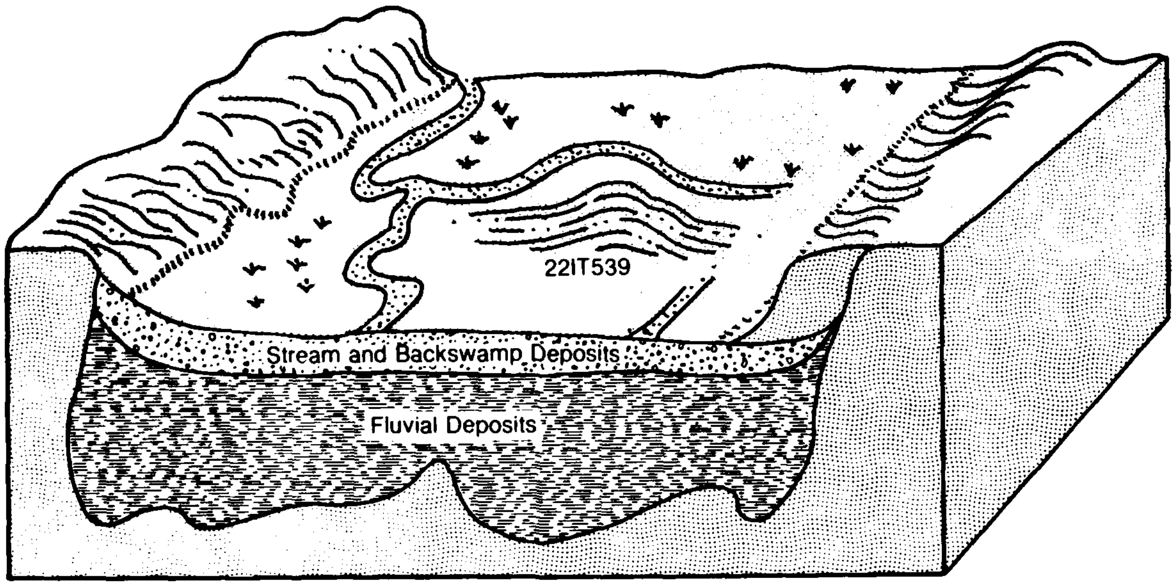
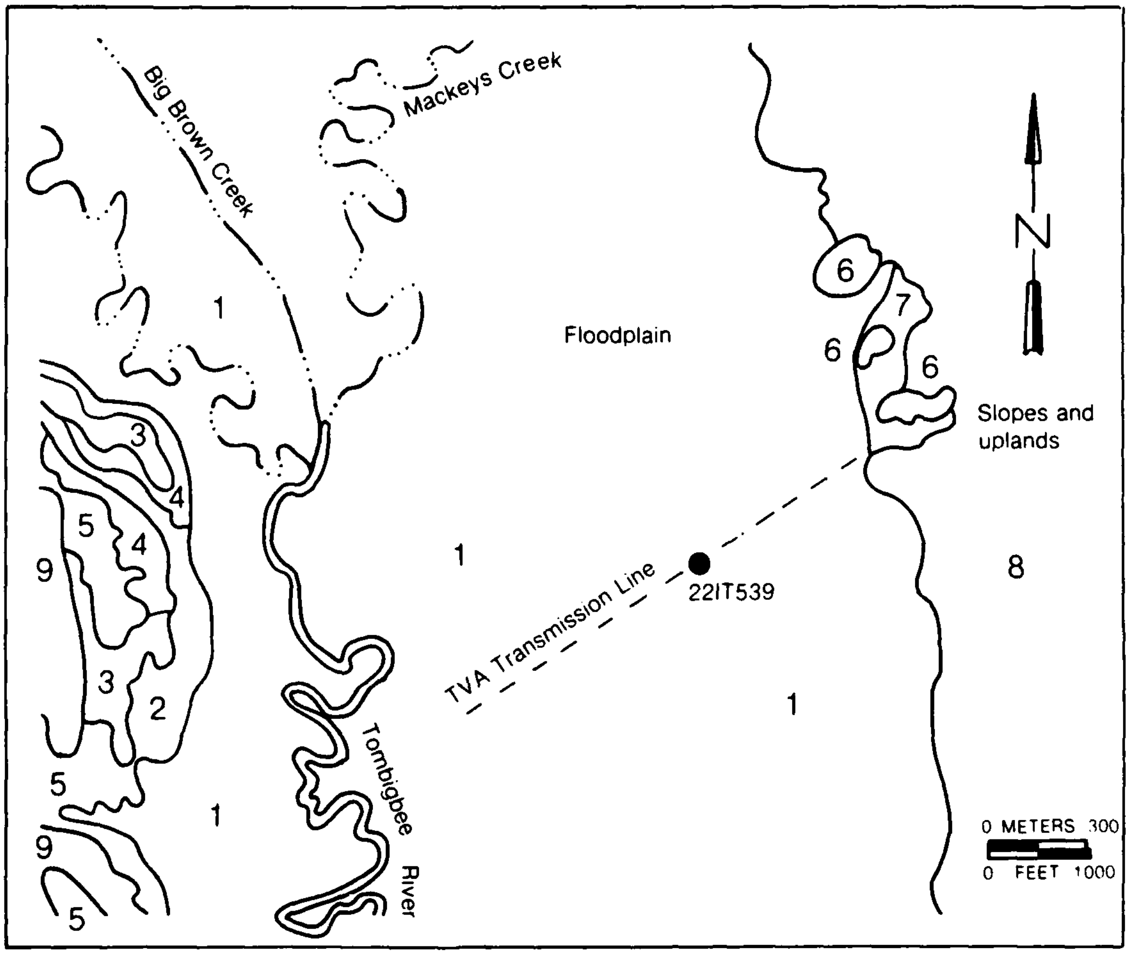


Figure 5.4

Site 22IT539: Soils in floodplain in vicinity of site



SOIL LEGEND

SYMBOL	NAME
1	Kirkville-Mantachie association
2	Mathiston silt loam
3	Ora fine sandy loam, 2 to 5 percent slopes, eroded
4	Ora fine sandy loam, 8 to 12 percent slopes, eroded
5	Savannah loam, 2 to 5 percent slopes
6	Smithdale fine sandy loam, 5 to 8 percent slopes, eroded
7	Smithdale fine sandy loam, 8 to 17 percent slopes
8	Smithdale association, hilly
9	Savannah loam, 0 to 2 percent slopes

Figure 5.5

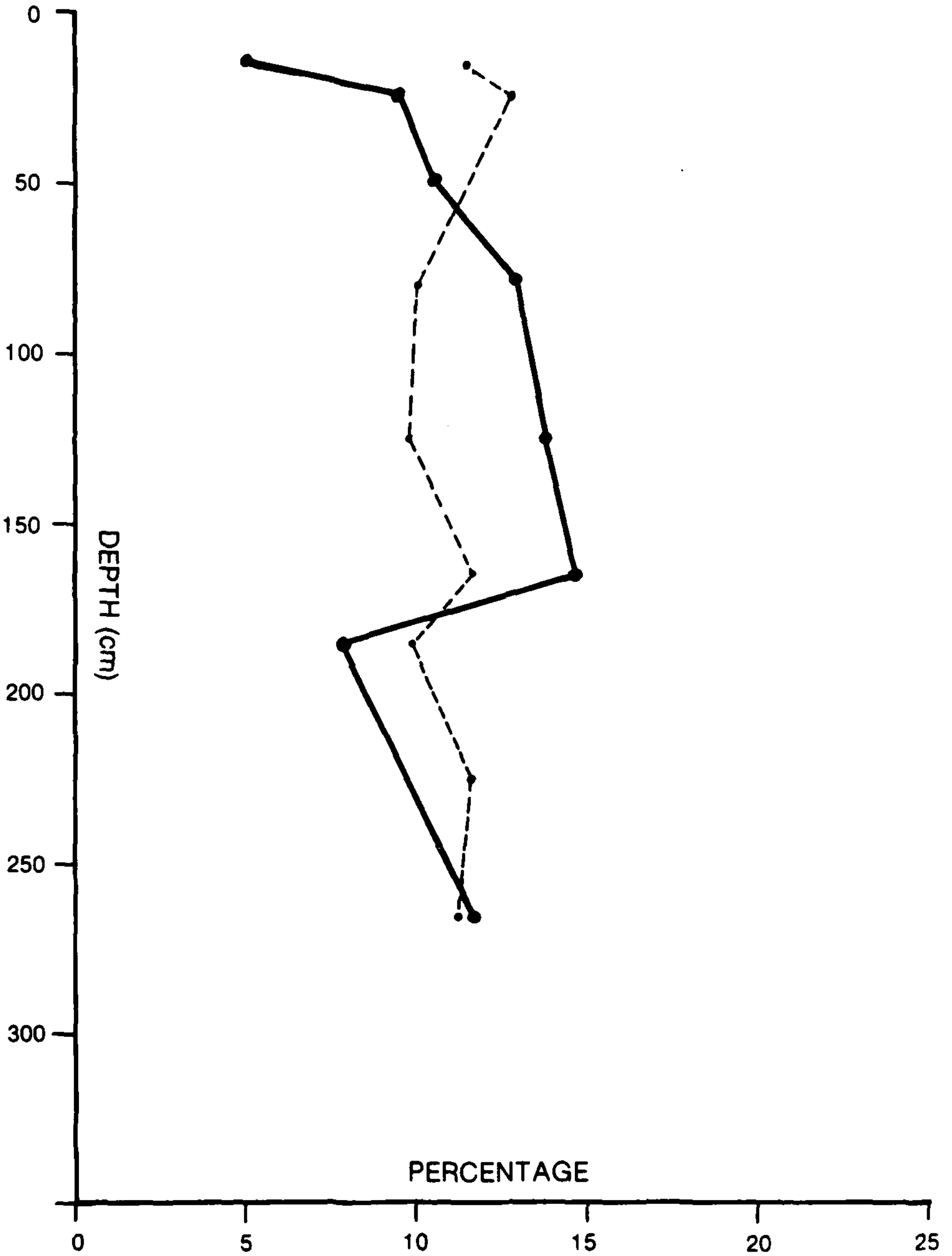
Site 22IT539: Pre-excavation surface showing cleared transmission line (foreground) and vegetation cover (background) looking south

Figure 5.6

Site 22IT539: Typical winter and spring access to site by boat

Figure 5.7

Site 22IT539: Constant sand fabric of representative pedon

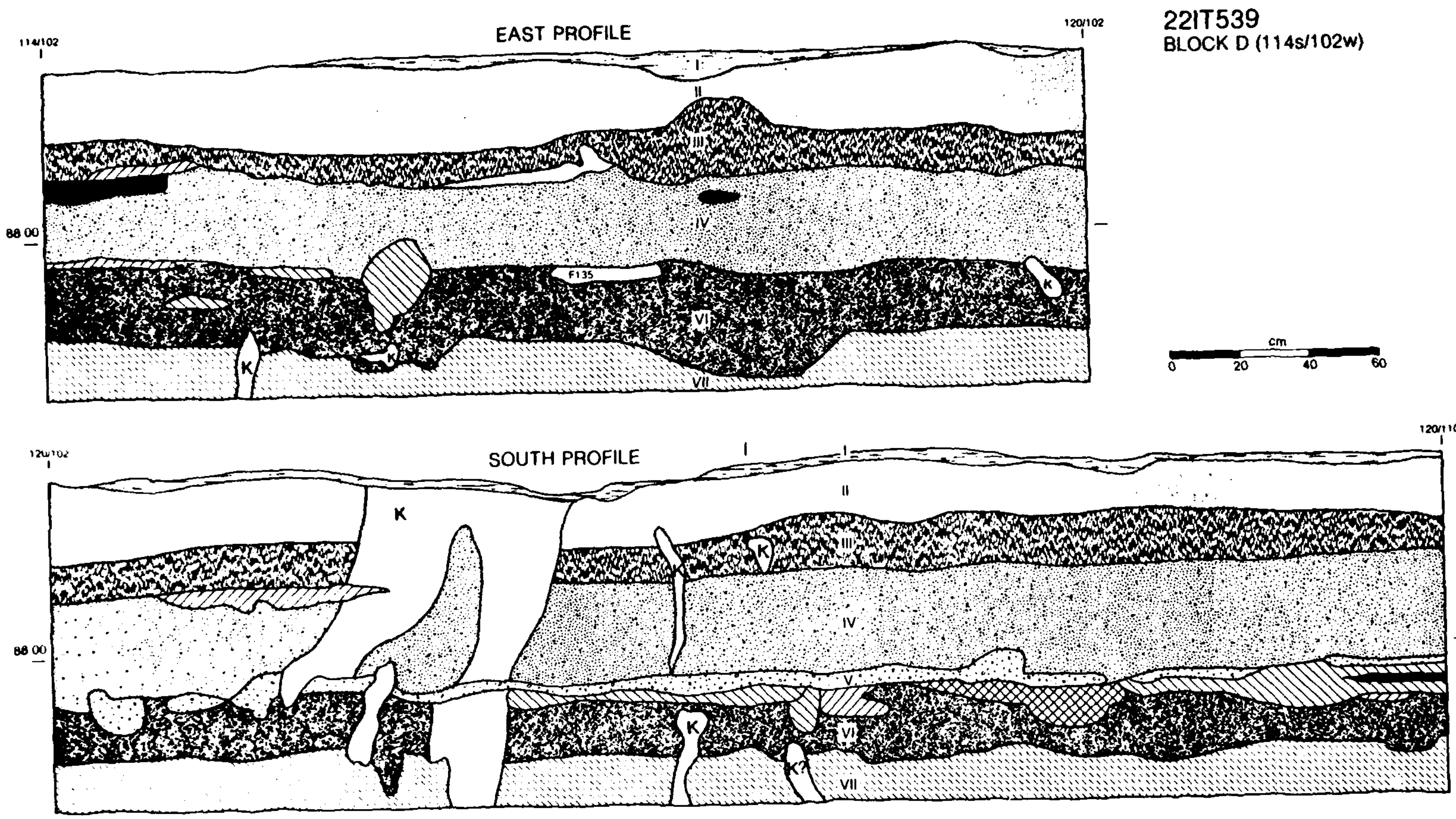


22IT539
Constant Sand Fabric

Clay
VFS/Sand

Figure 5.8

Site 22IT539: Stratigraphy of site as seen in Block D, East and South profiles

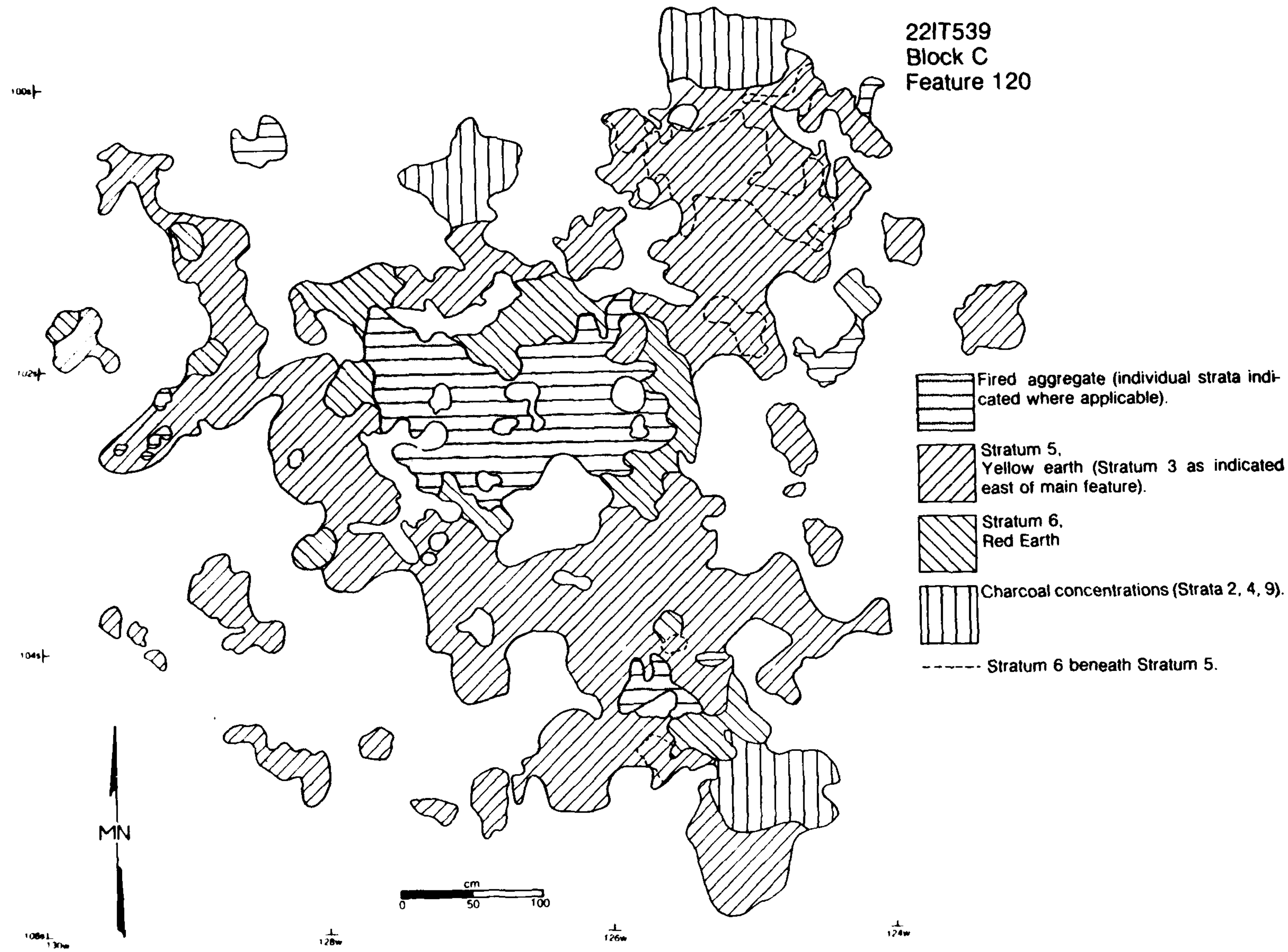


I. *Humus zone.*
II. Dark reddish brown (5YR 3/2) sandy loam.
III. Dark reddish brown (5YR 3/2 and 5YR 3/4) loam mottled with strong brown (7.5YR 5/8)
IV. Very dark brown (10YR 2/2) sandy loam with *undulating* dark reddish brown (5YR 3/2) and dark brown (7.5YR 3/2) loam lamellae
V. Very dark brown (10YR 2/2) sandy loam mottled with brown (10YR 4/3) and yellowish brown (10YR 5/8). Common charcoal and fired aggregate inclusions.
VI. Very dark brown (10YR 2/2) sandy loam grading to light yellowish brown (10YR 6/4) and brown (10YR 5/3) with depth.
VII. Dark yellowish brown (10YR 4/4) sandy loam with polygonal development.

Charcoal concentration
Fragmented fired aggregate and light earth
Light sediments with fired aggregates and charcoal
K Krotovina
Mottled sediments (or earth) with fired aggregates and charcoal

Figure 5.9

Site 22IT539: Fired aggregate, Feature 120, Block C



22IT539
Block C
Feature 120
Fired aggregate (individual strata indicated where applicable).
Stratum 5, Yellow earth (Stratum 3 as indicated east of main feature).
Stratum 6, Red Earth
Charcoal concentrations (Strata 2, 4, 9).
Stratum 6 beneath Stratum 5.
MN
cm
0
50
100

Figure 5.10

Site 22IT539: Fired aggregate, Feature 6, Block B

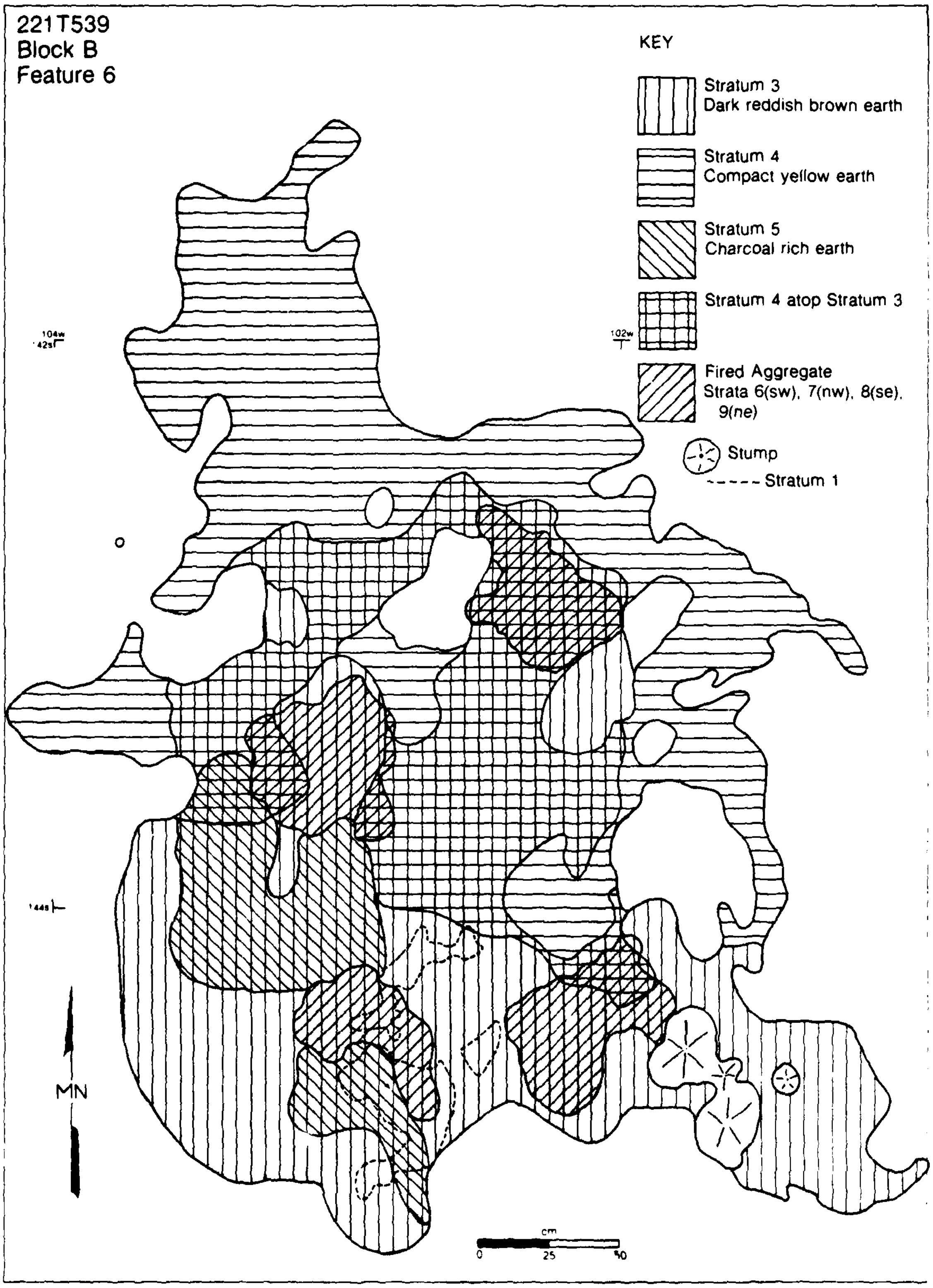

221T539
Block B
Feature 6
KEY
Stratum 3
Dark reddish brown earth
Stratum 4
Compact yellow earth
Stratum 5
Charcoal rich earth
Stratum 4 atop Stratum 3
Fired Aggregate
Strata 6(sw), 7(nw), 8(se), 9(ne)
Stump
Stratum 1
104w
42s
102w
44s
MN
cm
0
25
50

Figure 5.11

Site 22IT539: Fired aggregate, Feature 120, Block C

Figure 5.12

Site 22IT539: Feature 134, Burial 19: Cremation with effigy beads, Block D

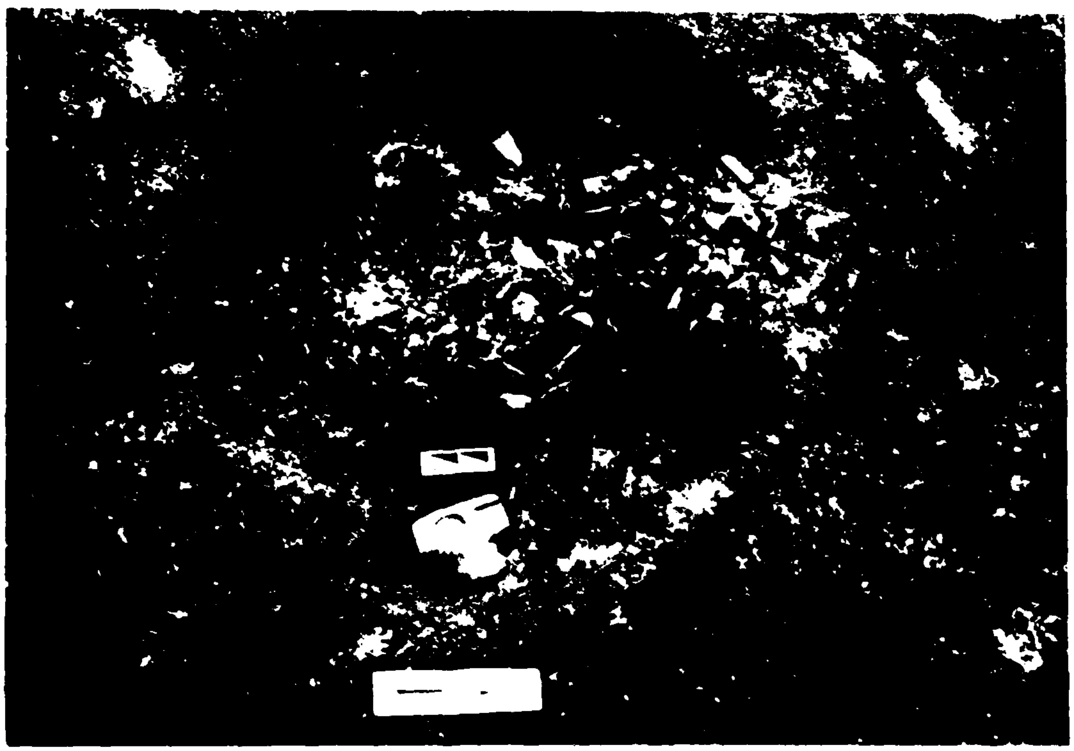


Figure 5.13

Site 22IT539: Pit Feature 142

Figure 5.14

Site 22IT539: Stratigraphy of Block D, East profile


22 IT 539
FEATURE 142
CP 118.35 - 102.90
TOP ELEV 87.40
EAST PROFILE
BLOCK D
02 SEPT 80


EAST WALL
PROFILE

Figure 5.15

Site 22IT539: Horizontal distribution of burials, Block A

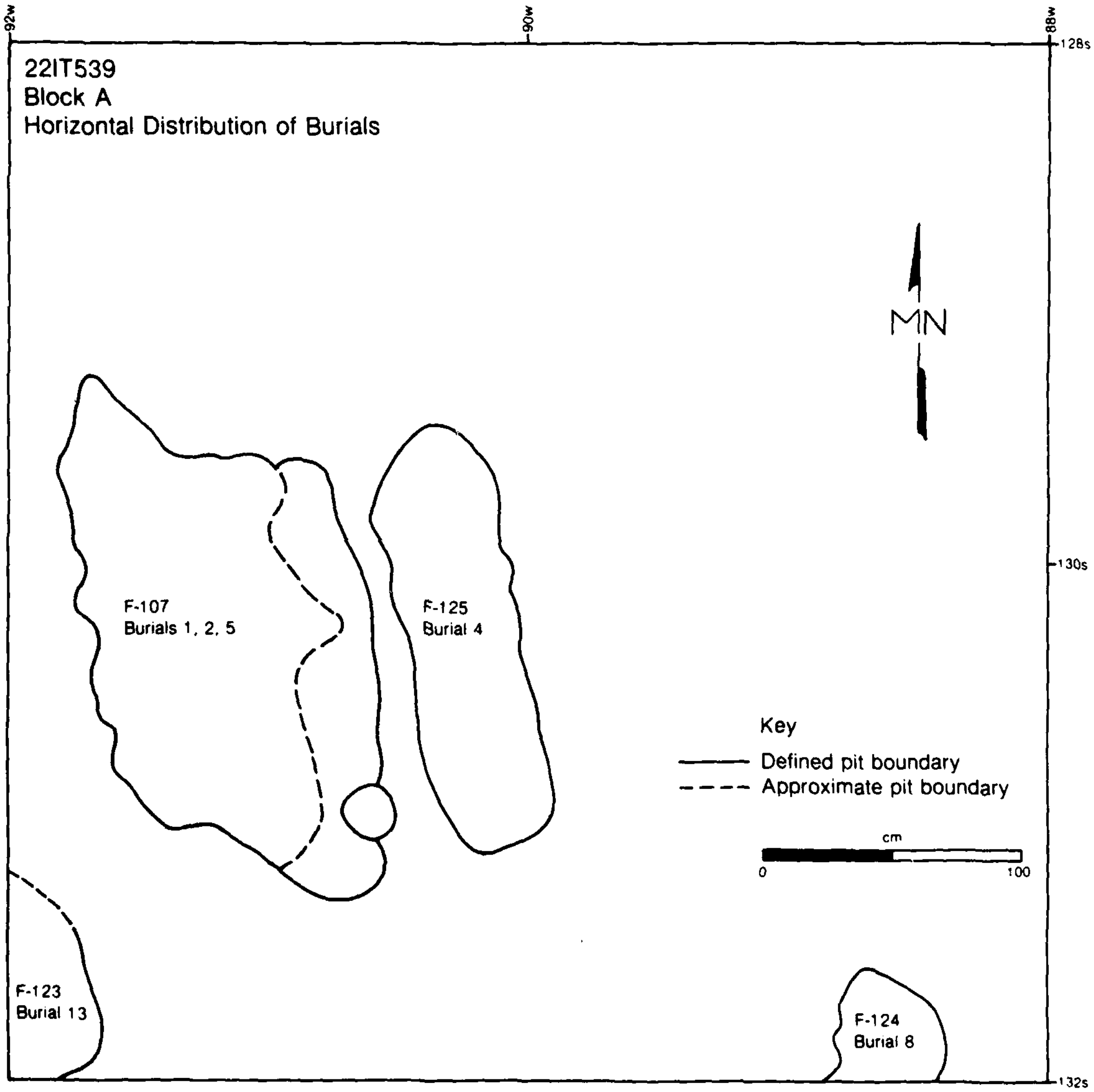
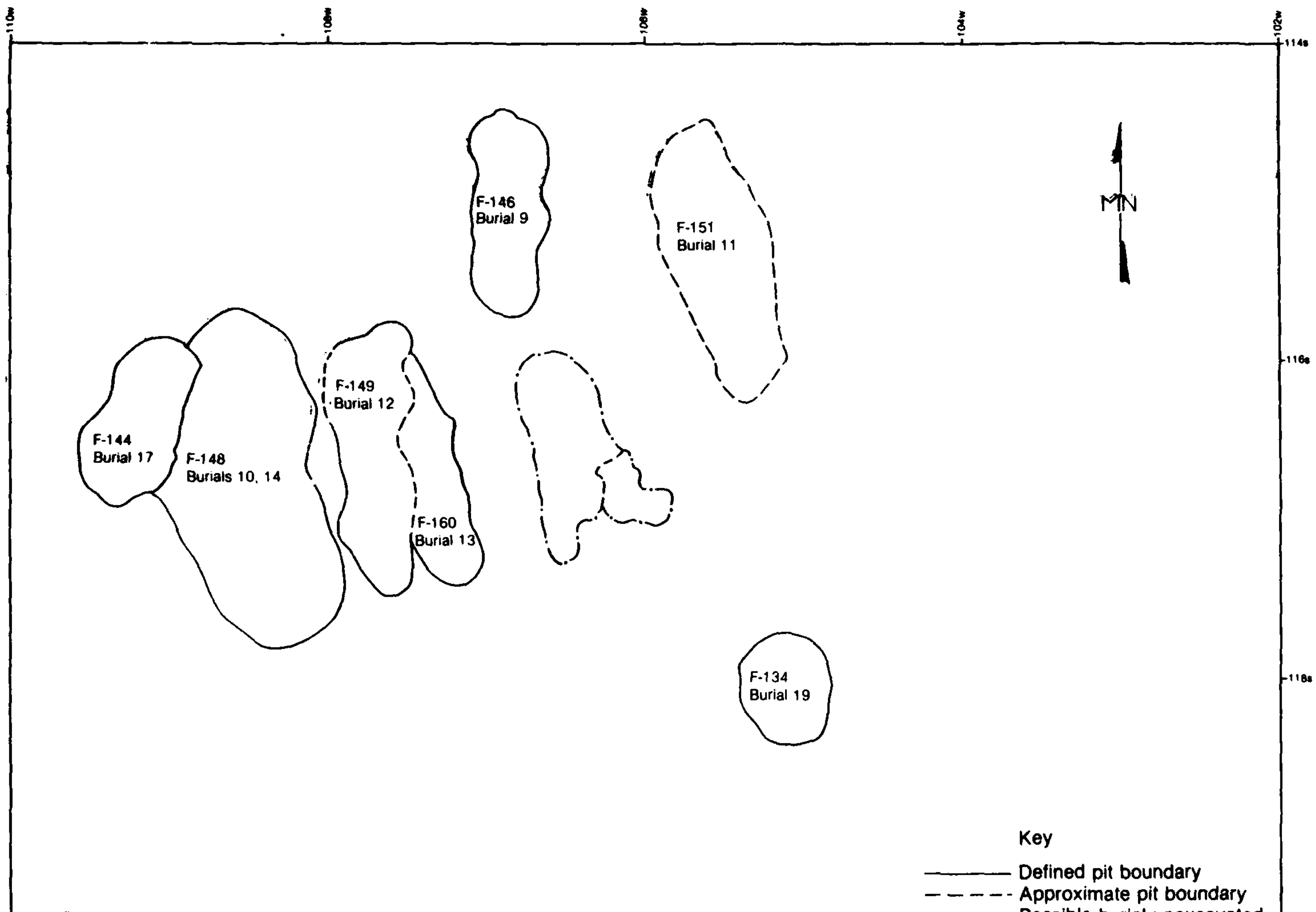

92w
90w
88w
128s
130s
132s
22IT539
Block A
Horizontal Distribution of Burials
MN
F-107
Burials 1, 2, 5
F-125
Burial 4
Key
Defined pit boundary
Approximate pit boundary
cm
0
100
F-123
Burial 13
F-124
Burial 8

Figure 5.16

Site 22IT539: Horizontal distribution of burials, Block D



22IT539
Block D
Horizontal Distribution of Burials

Figure 5.17

Site 22IT539: Burial 1 with skeleton in place

Figure 5.18

Site 22IT539: Burial 2 maxilla with teeth present


FEATURE 107
BURIAL 1
BLOCK A

Figure 5.19

Site 22IT539: Selected Grog and Shell Tempered Ceramics

Grog Tempered
- a. Mulberry Creek Cord Marked (1393-11)
- b. Mulberry Creek Cord Marked (1800-10)
- c. Cormorant Cord Impressed (1904-51)
- d. Cormorant Cord Impressed (1904-50)
- e. Cormorant Cord Impressed (1394-12)
- f. Cormorant Cord Impressed (1391-2)

Shell/Grog Tempered
- g. Smoothed-over Fabric Impressed (2548-1)

Shell Tempered
- h. Mississippian Plain (1633-3)

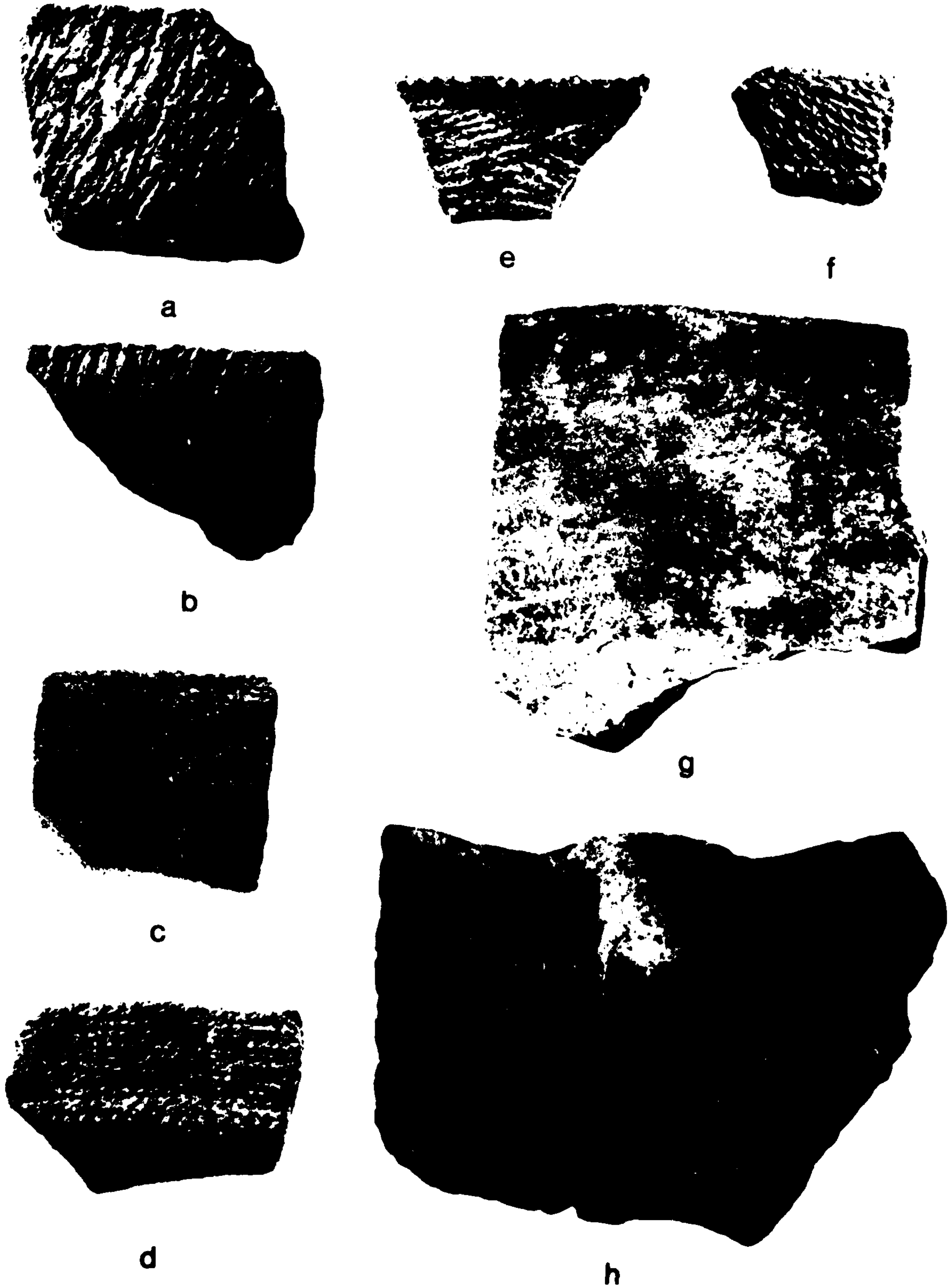

a
e
f
b
g
c
d
h

Figure 5.20

Site 22IT539: Selected Sand and Grog Tempered Ceramics

Sand Tempered
- a. Furrs Cord Marked (1903-7)
- b. Furrs Cord Marked (1903-5)
- c. Saltillo Fabric Marked (3187-10)
- d. Saltillo Fabric Marked (2041-21)
- e. Alexander Incised (1910-43)
- f. Columbus Punctate (2360-16)
- g. O'Neal Plain (2036-1)
- h. Alexander Pinched (3043-12)
- i. Alexander Pinched (1396-21)
- j. Columbus Punctate (1915-14)

Grog Tempered
- k. Baytown Plain (2073-1)
- l. Baytown Plain (1957-3)

Figure 5.21

Site 22IT539: Selected Fiber, Bone, and Limestone Tempered Ceramics

Fiber Tempered
a. Wheeler Plain (1860-26)
b. Wheeler Plain
c. Wheeler Punctate (2341-27)
d. Wheeler Punctate (1915-39)
e. Wheeler Dentate (3141-9)
f. Wheeler Dentate (2472-4)
g. Other (pinched) (1913-21)
h. Wheeler Simple Stamped (2341-29)

Bone Tempered
i. Turkey Paw Cord Marked (1642-26)
j. Turkey Paw Cord Marked (1953-17)

Limestone Tempered
k. Flint River Cord Marked (2617-1)
l. Flint River Cord Marked (2750-3)

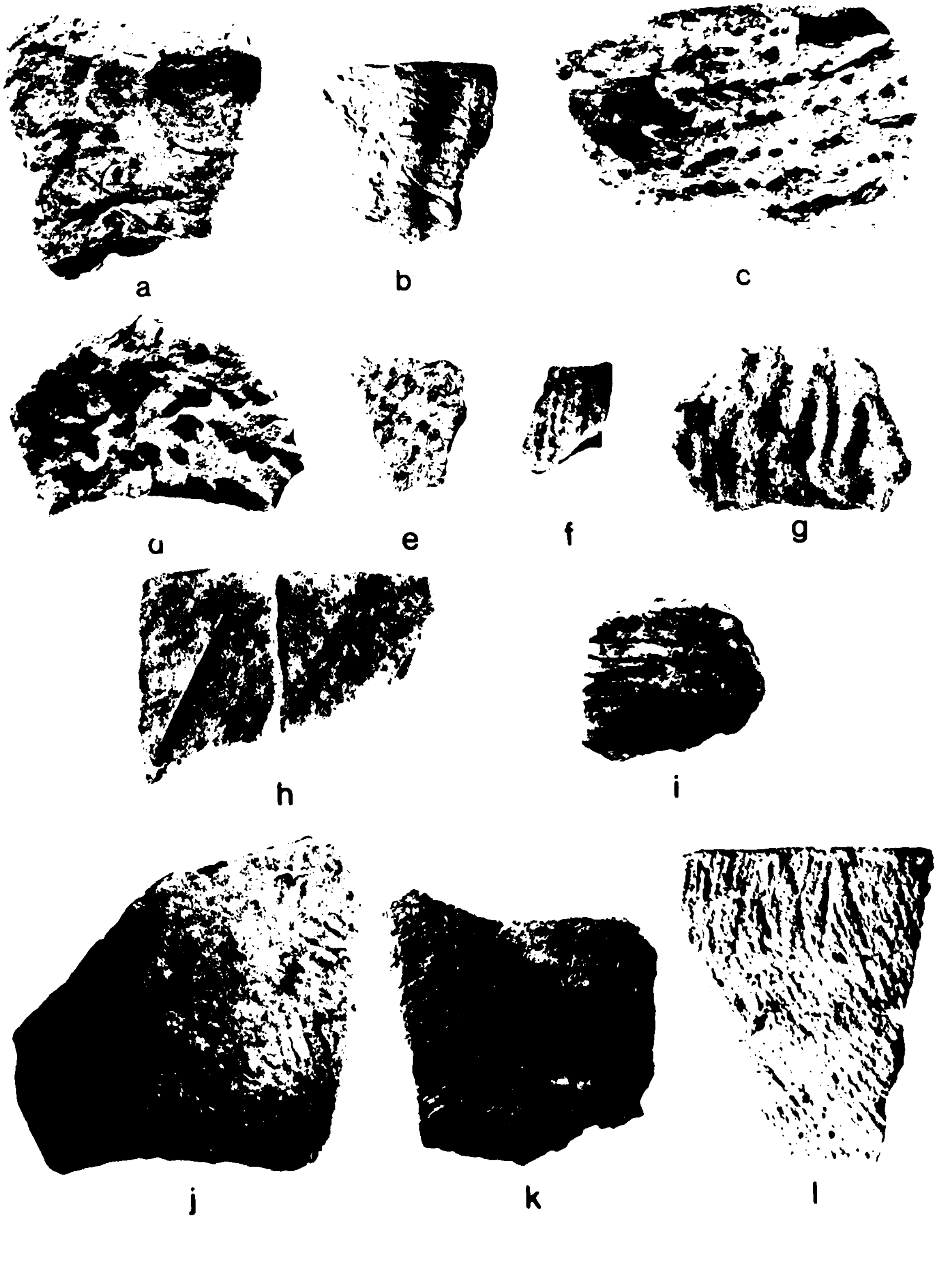

a
b
c
d
e
f
g
h
i
j
k
l

Figure 5.22

Site 22IT539: Selected Shell and Shell/Grog Tempered Ceramics and Benton Short Stemmed Projectile Point/Knives

Shell Tempered
- a. Moundville Incised (1817-2)
- b. Moundville Incised (1874-3)
- c. Barton Incised (39-2)
- d. Decorated Shell/Cord Marked (1397-4)
- f. Moundville Incised (1453-1)

Shell/Grog Tempered
- e. Shell/Grog Incised

Benton Short Stemmed
- g. (3422-2)
- h. (2026-16)
- i. (3319-1)
- j. (5035-1)
- k. (5449-1)
- l. (3530-1)
- m. (5340-1)

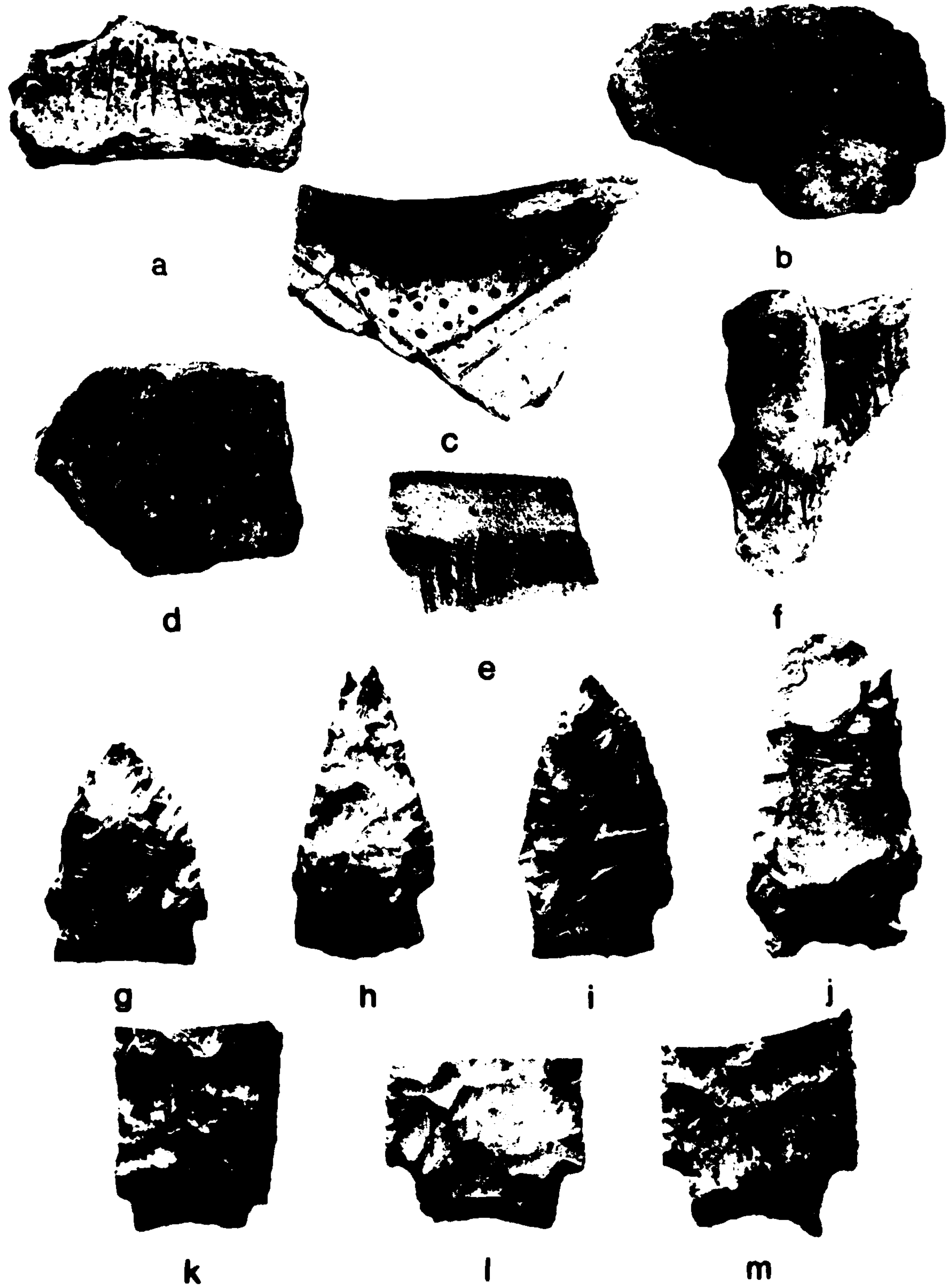
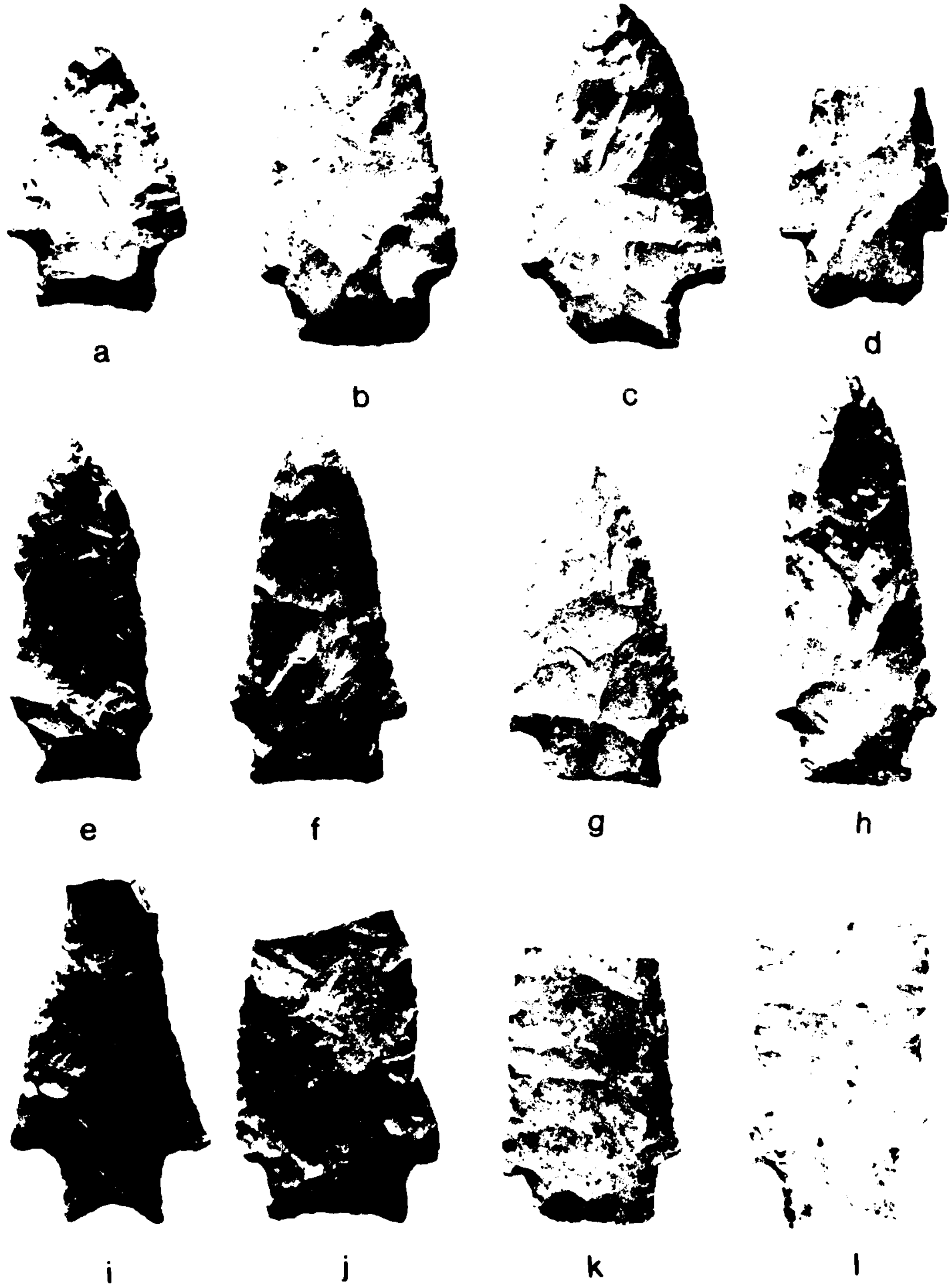

a
b
c
d
e
f
g
h
i
j
k
l
m

Figure 5.23

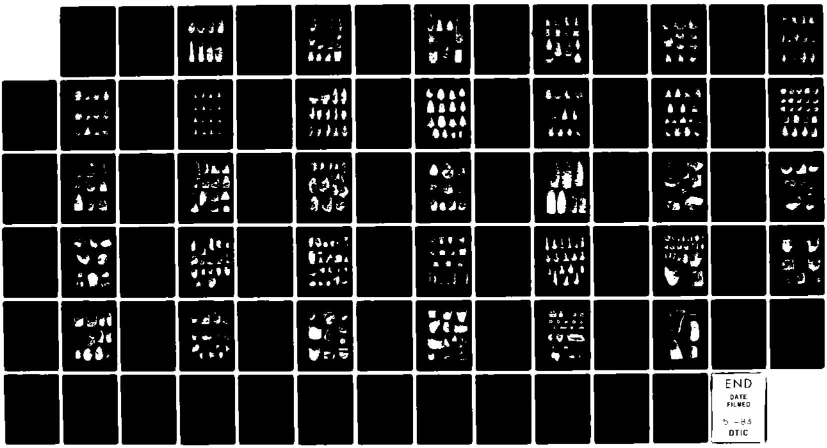
Site 22IT539: Selected Benton Short Stemmed Projectile Point/Knives

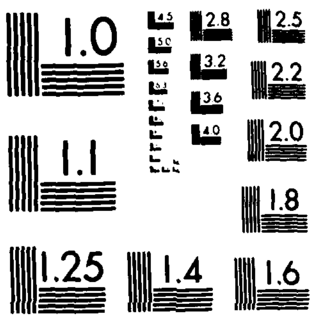
a. (2035-5)
b. (2759-3)
c. (2759-4)
d. (2294-13)
e. (3150-1)
(2069-1)
g. (3400-3)
h. (2751-3)
i. (2035-1)
j. (3139-2)
k. (4595-2)
l. (4618-1)


a
b
c
d
e
f
g
h
i
j
k
l

AD-A126 690 ARCHAEOLOGICAL INVESTIGATIONS IN THE UPPER TOMBIGBEE VALLEY MISSISSIPPI:..(U) UNIVERSITY OF WEST FLORIDA PENSACOLA OFFICE OF CULTURAL AND A.. J A BENSE ET AL. 6/6

UNCLASSIFIED 1983 DACW01-80-C-0063 F/G 5/6 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Figure 5.24

Site 22IT539: Selected Benton Short Stemmed Projectile Point/Knives

a. (3400-2)
b. (2035-1)
c. (2347-1)
d. (5265-1)
e. (3054-1)
f. (3181-2)
g. (3152-1)
h. (3310-101)

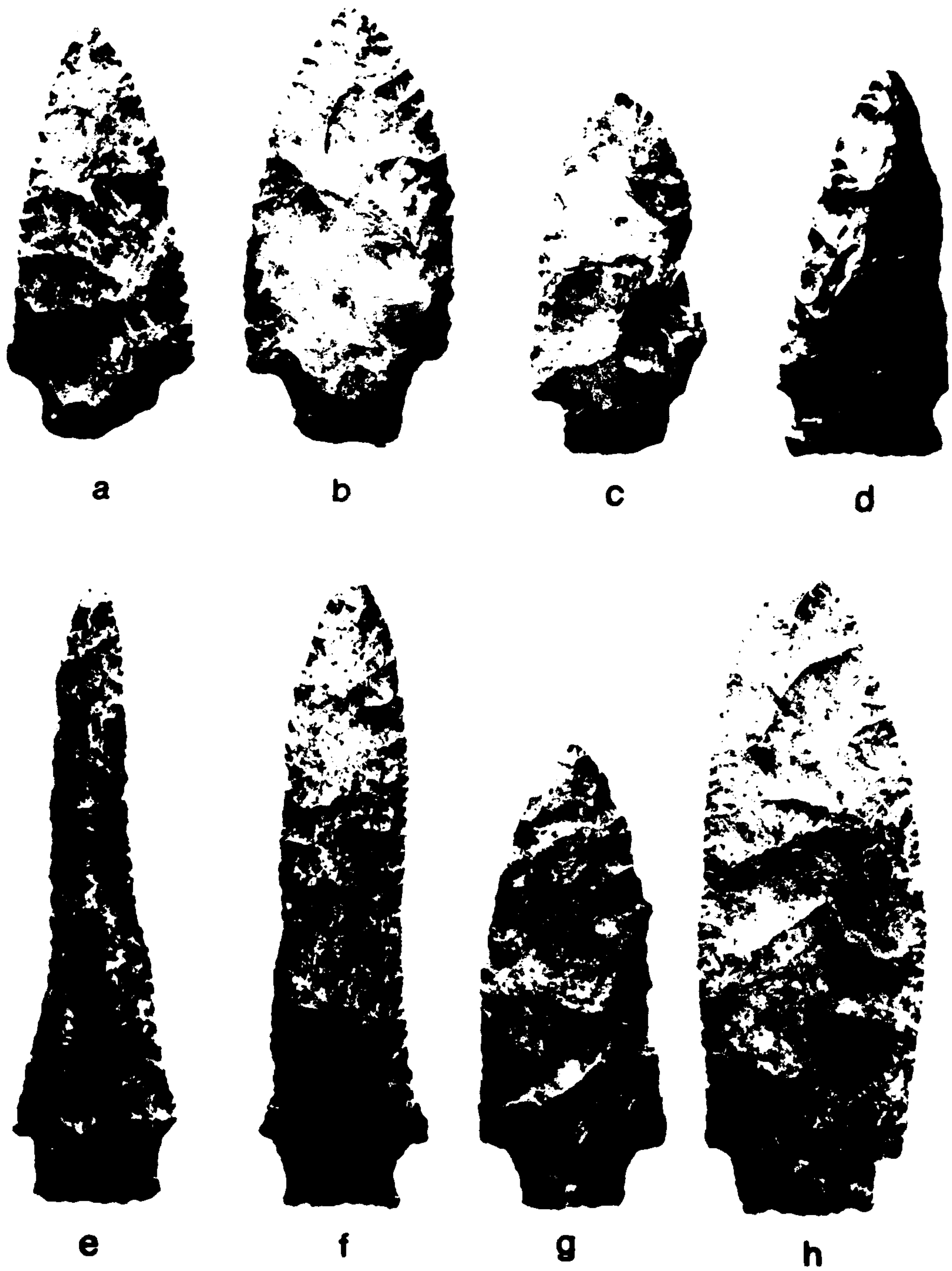
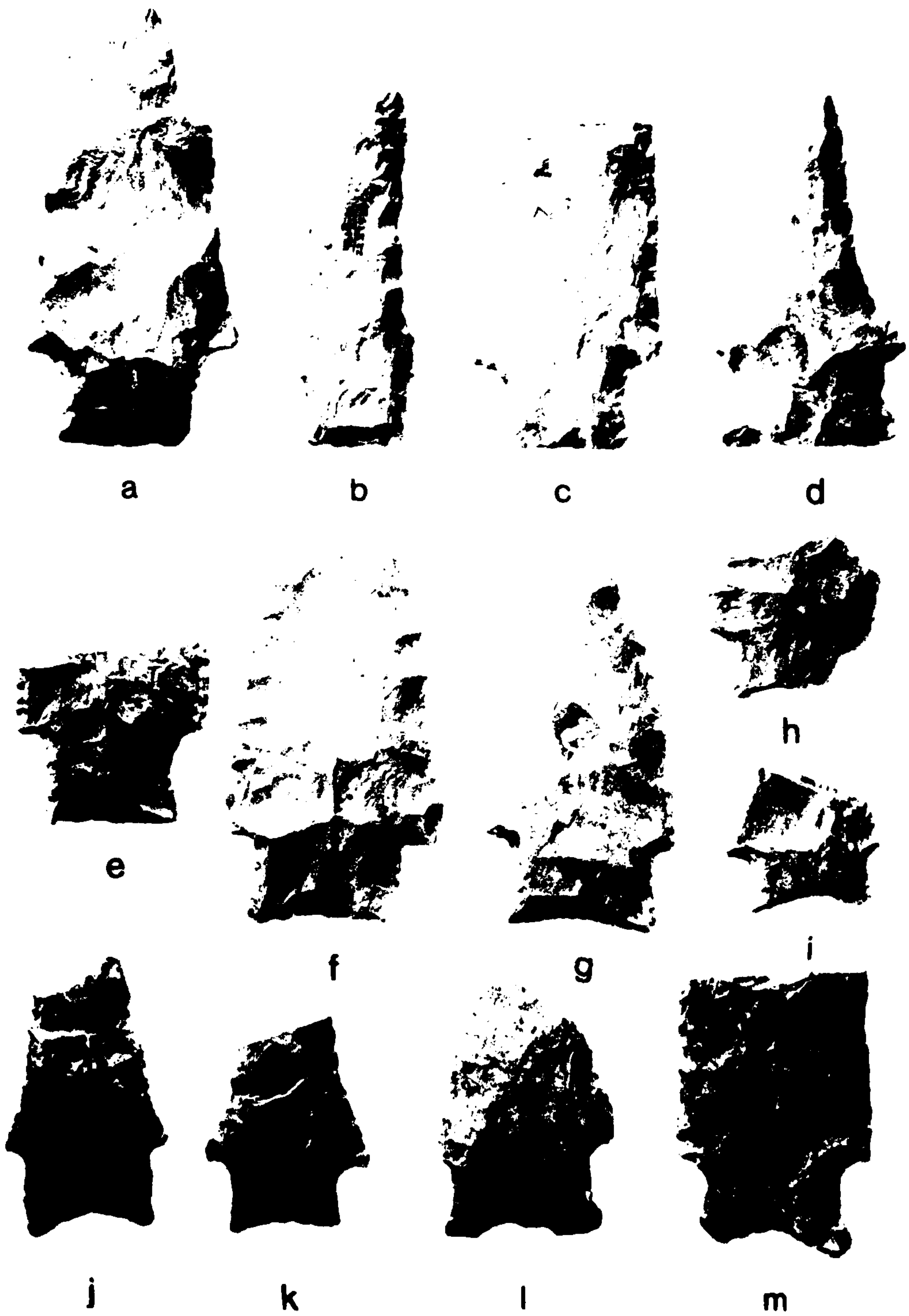

a
b
c
d
e
f
g
h

Figure 5.25

Site 22IT539: Selected Benton Extended Stemmed Projectile Point/Knives

a. (2761-3)
b. (4619-1)
c. (3188-5)
d. (2678-2)
e. (3034-1)
f. (3288-1)
g. (3240-2)
h. (1467-2)
i. (3151-2)
j. (2038-1)
k. (1652-57)
l. (2481-5)
m. (2035-2)


a
b
c
d
e
f
g
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i
j
k
l
m

Figure 5.26

Site 22IT539: Selected Benton Barbed Projectile Point/Knives

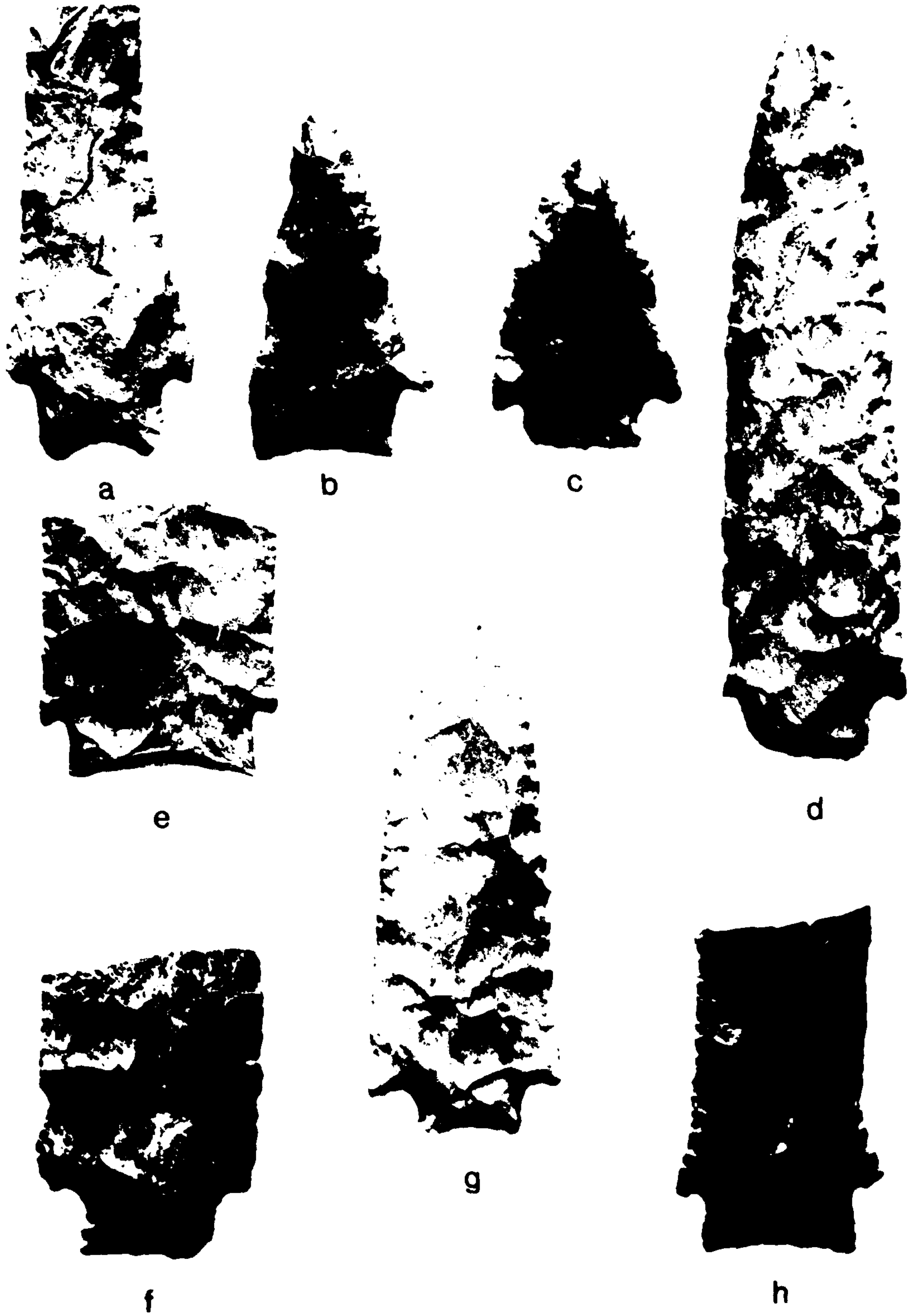
a
b
c
e
d
g
f
h

Figure 5.27

Site 22IT539: Selected Big Sandy, Bradley Spike, and Crawford Creek Projectile Point/Knives

Big Sandy
a. (5020-1)
b. (6122-1)
c. (4590-2)
d. (3341-1)
e. (3141-1)
f. (5561-1)
g. (6123-1)
h. (6112-1)

Bradley Spike
i. (1392-35)

Crawford Creek
j. (5580-1)
k. (5670-1)
l. (5664-1)
m. (5714-1)
n. (3191-10)

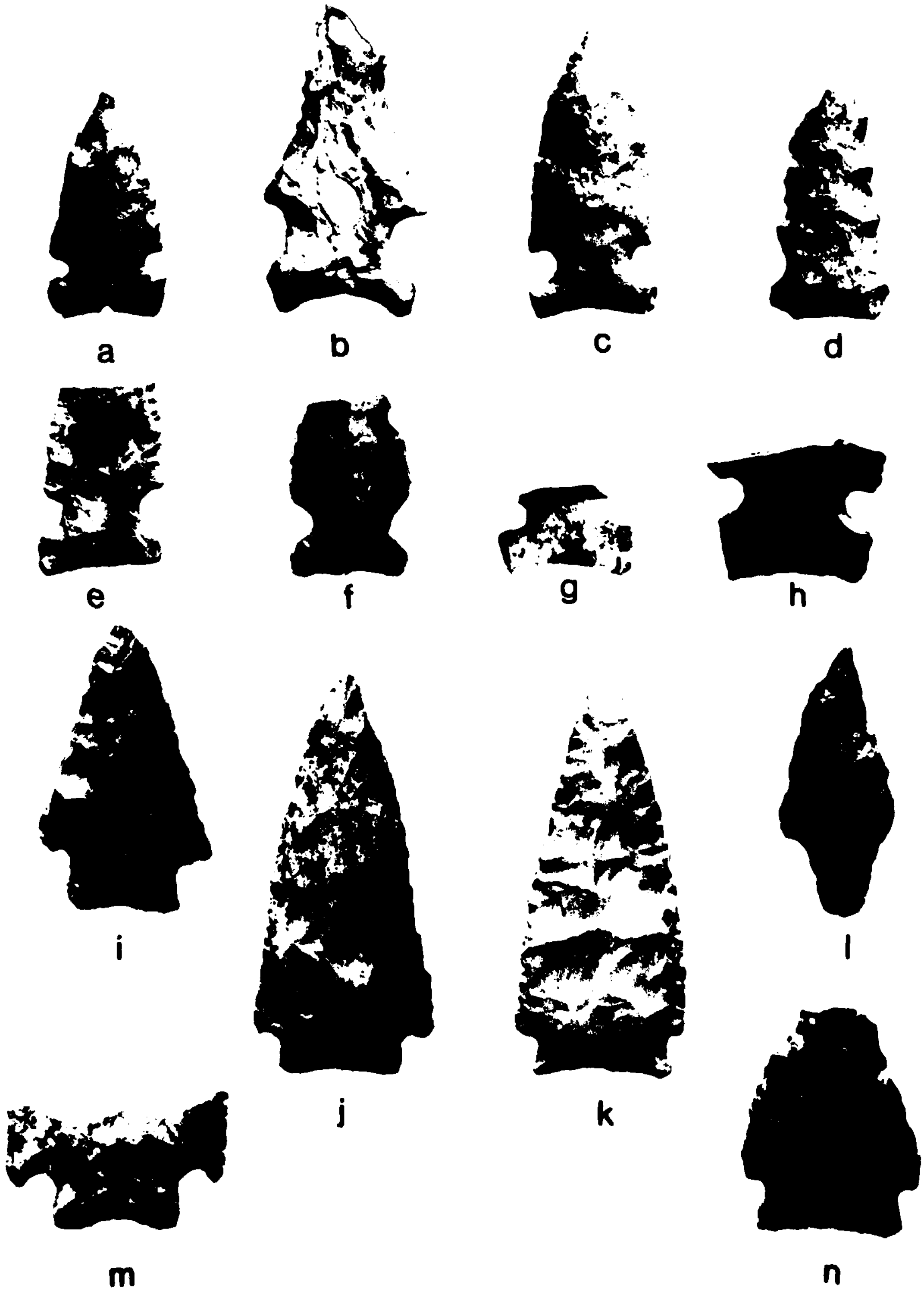

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Figure 5.28

Site 22IT539: Selected Cypress Creek, Dalton, and Elora Projectile Point/Knives

Cypress Creek
- a. (5597-1)
- b. (3562-1)
- c. (1492-1)
- d. (5664-2)
- e. (5137-1)
- f. (5597-24)
- g. (5597-2)
- h. (5070-1)

Dalton
- i. (2922-1)
- j. (3398-1)

Elora
- k. (5782-1)

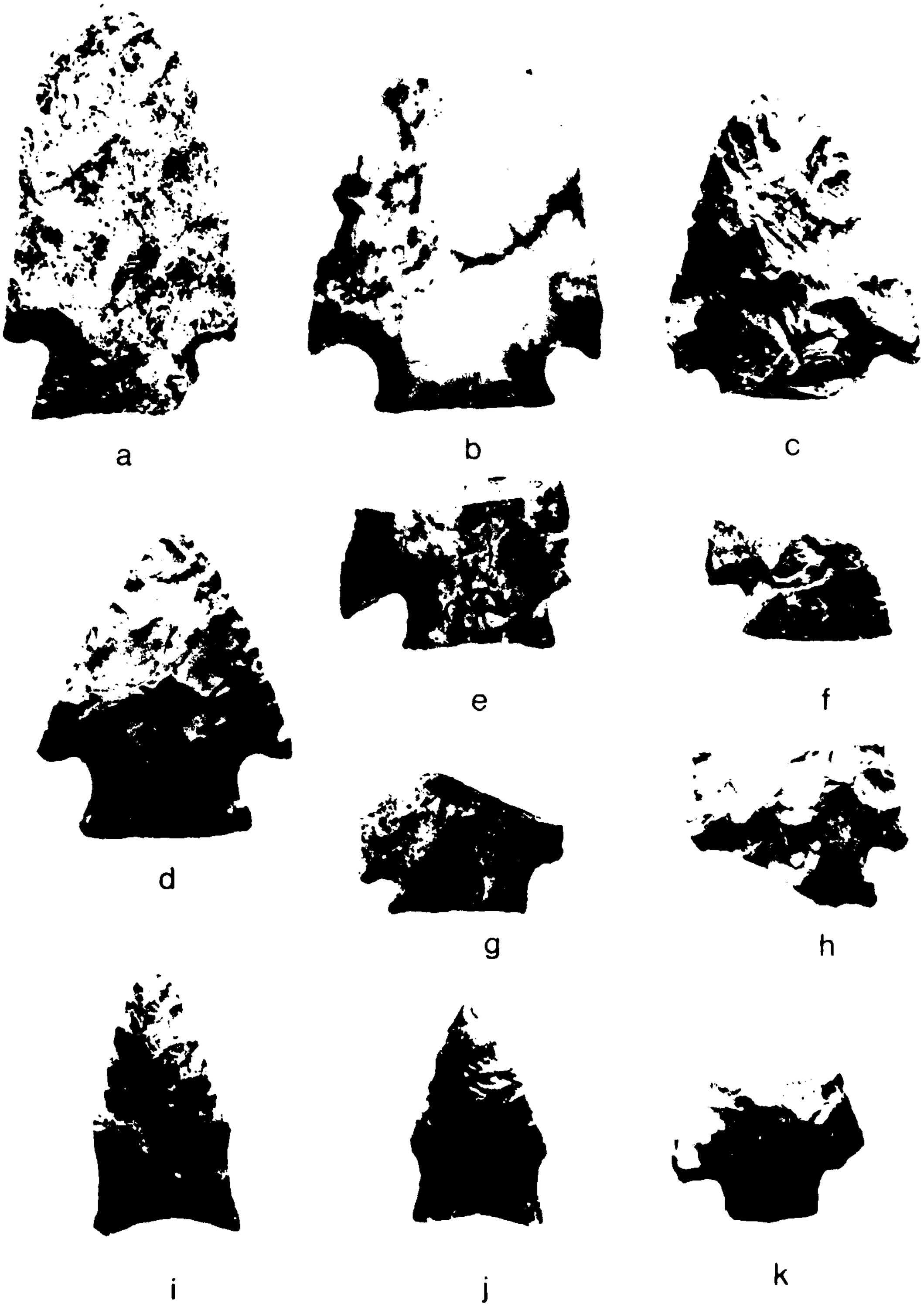
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Figure 5.29

Site 22IT539: Selected Eva, Flint Creek, and Gary Projectile Point/Knives

Eva
- a. (5534-1)
- b. (5153-1)
- c. (3013-1)
- d. (3252-1)

Flint Creek
- e. (1433-2)
- f. (2370-3)
- g. (1444-11)
- h. (1405-30)
- i. (1429-14)
- j. (1425-3)

Gary
- k. (2039-16)
- l. (1866-5)
- m. (1866-6)

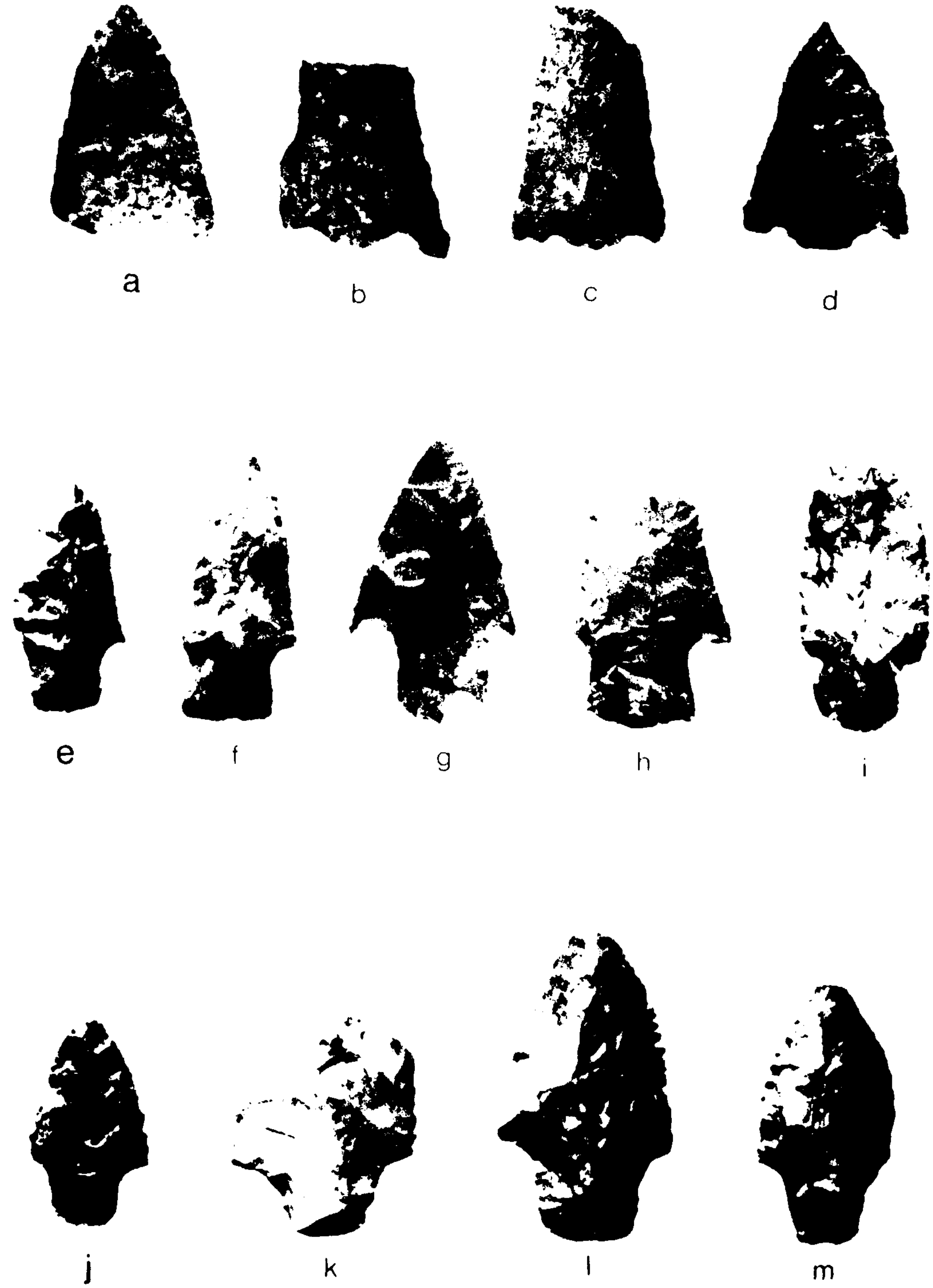
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Figure 5.30

Site 22IT539: Selected Kirk Corner Notched Projectile Point/Knives

a. (4173-1)
b. (5849-1)
c. (3375-2)
d. (2035-15)
e. (6156-1)
f. (2374-23)
g. (5904-1)
h. (6113-1)
i. (5580-2)
j. (3375-1)
k. (6206-1)
l. (5110-1)

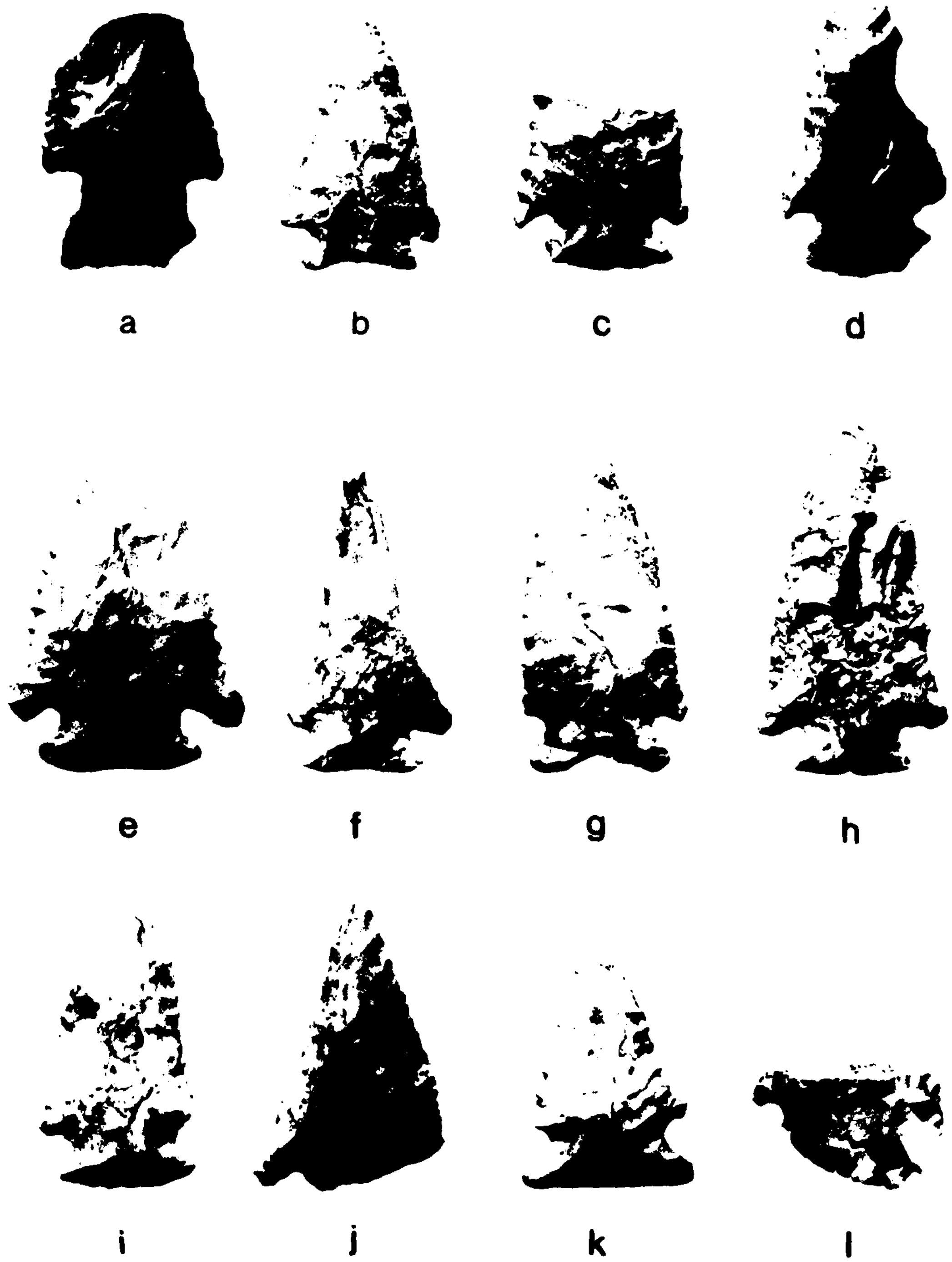
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Figure 5.31

Site 22IT539: Selected Late Woodland-Mississippian Triangular Projectile Point/Knives

a. (1904-115)
b. (1904-111)
c. (1904-114)
d. (1898-12)
e. (1395-63)
f. (1649-51)
g. (1800-39)
h. (1808-59)
i. (1904-112)
j. (1882-78)
k. (1759-41)
l. (1902-143)
m. (1816-30)
n. (1902-142)
o. (1904-110)
p. (1904-113)

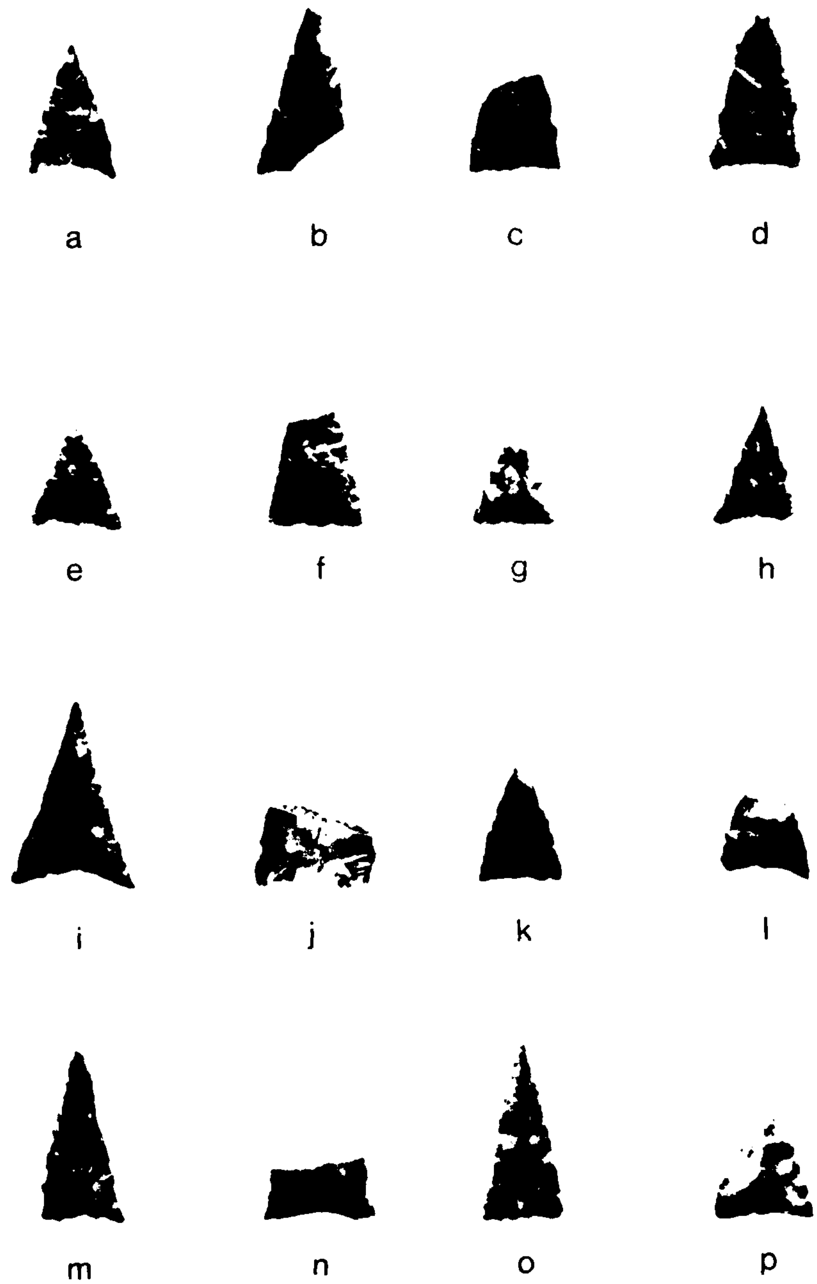
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Figure 5.32

Site 22IT539: Selected Ledbetter/Pickwick, Little Bear Creek, McCorkle, and McIntire Projectile Point/Knives

Ledbetter/Pickwick
- a. (1504-201)
- b. (1395-64)

Little Bear Creek
- c. (1910-81)
- d. (3182-2)
- e. (2481-6)
- f. (2341-45)
- g. (5215-1)
- h. (2065-49)
- i. (2341-44)
- j. (1394-78)
- k. (1913-133)
- l. (1729-60)

McCorkle
- m. (3441-1)

McIntire
- n. (1868-17)

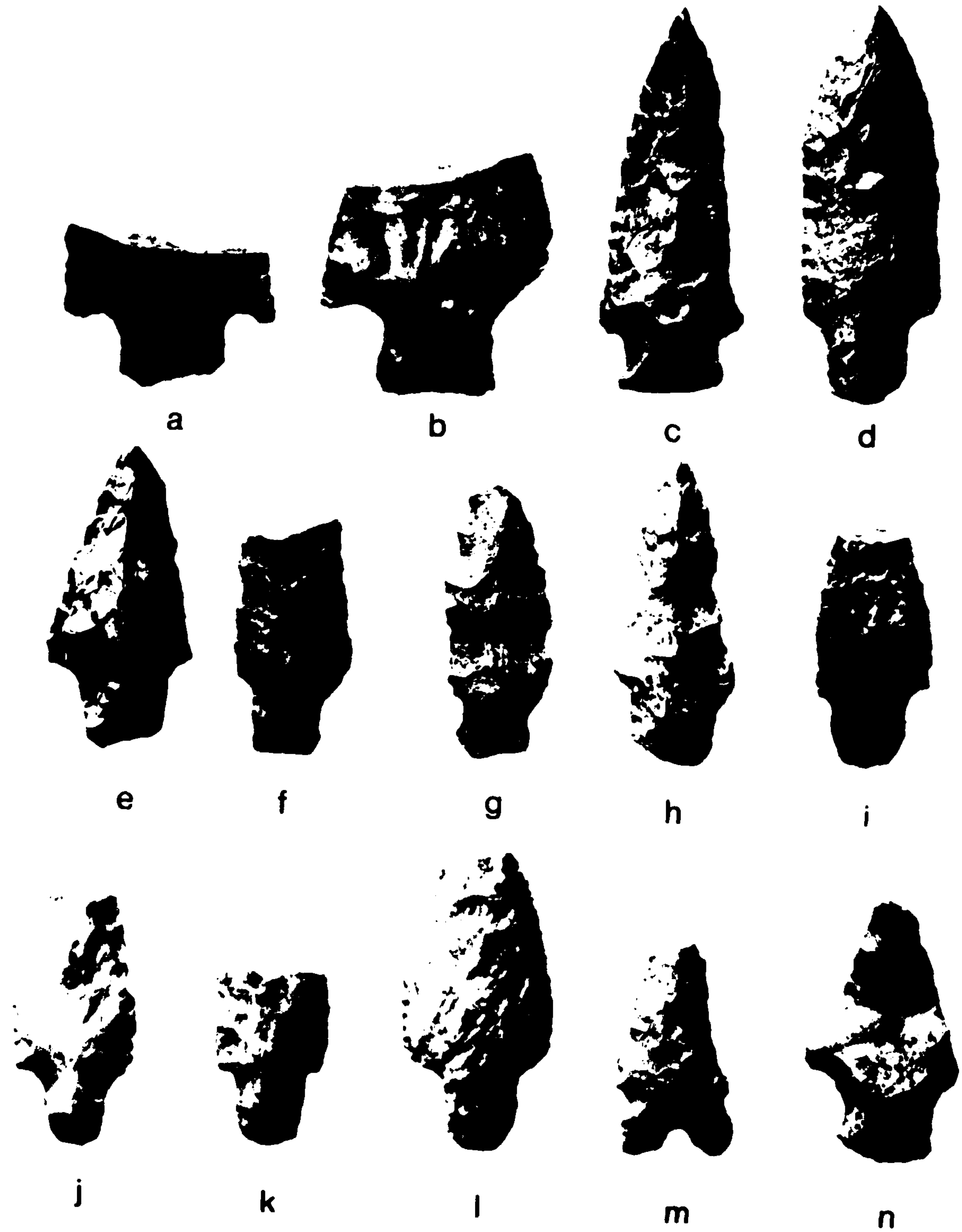

Figure 5.33

Site 22IT539: Selected Morrow Mountain, Morrow Mountain Round Base, Morrow Mountain Straight Stem, and Mud Creek Projectile Point/Knives

Morrow Mountain
a. (5087-1)
b. (5605-1)
c. (5335-2)
d. (2560-5)
e. (5663-1)

Morrow Mountain Round Base
f. (3201-3)
g. (5697-1)

Morrow Mountain Straight Stem
h. (5641-1)
i. (5757-1)
j. (5028-1)
k. (5211-1)
l. (4626-1)
m. (4648-1)
n. (2035-8)

Mud Creek
o. (1868-18)
p. (1720-37)

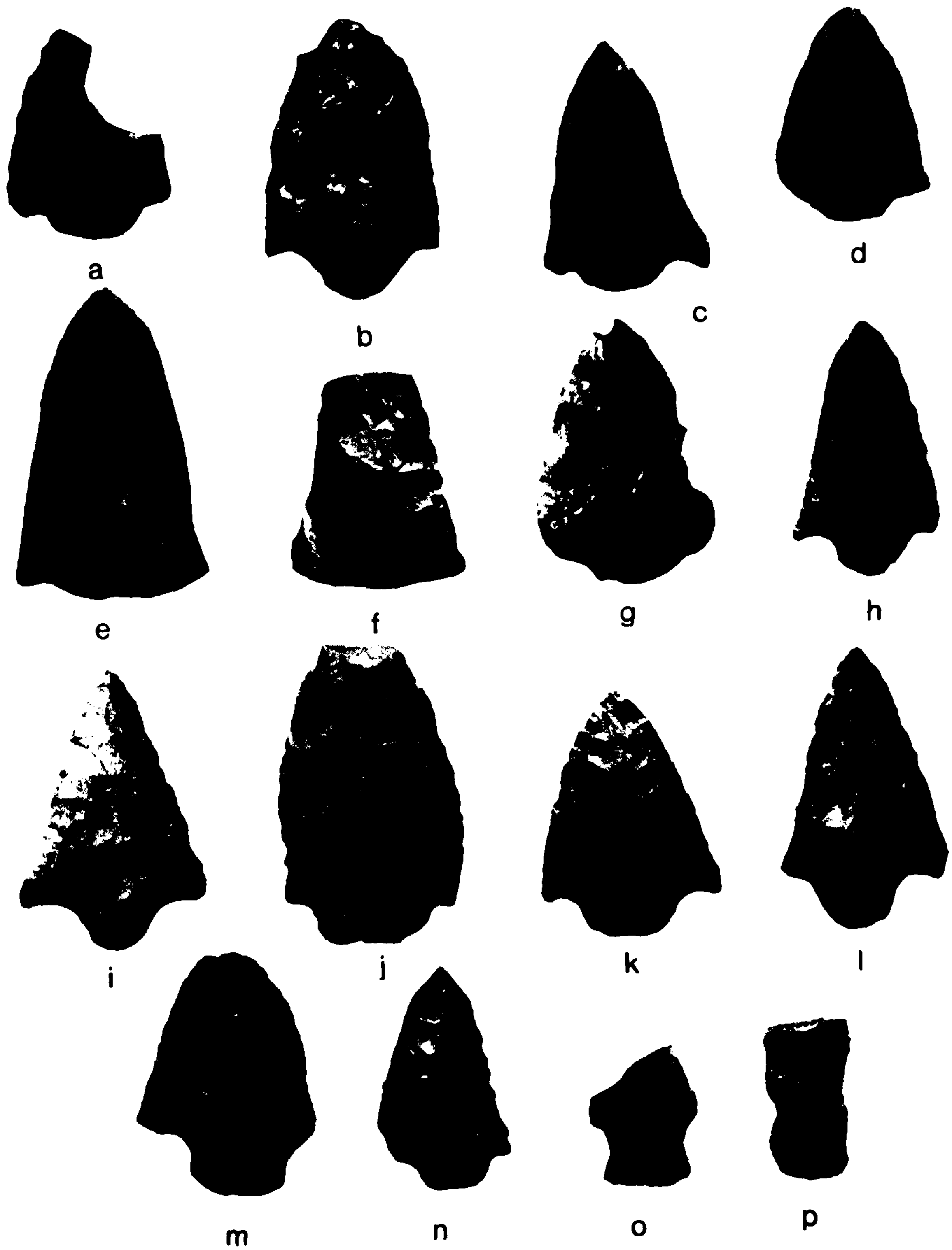
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Figure 5.34

Site 22IT539: Selected Residual Stemmed Projectile Point/Knives

a. (5396-1)
b. (5596-1)
c. (4643-3)
d. (5598-1)
e. (2035-11)
f. (3099-1)
g. (5325-1)
h. (4859-1)
i. (5194-1)
j. (2560-6)
k. (5307-1)

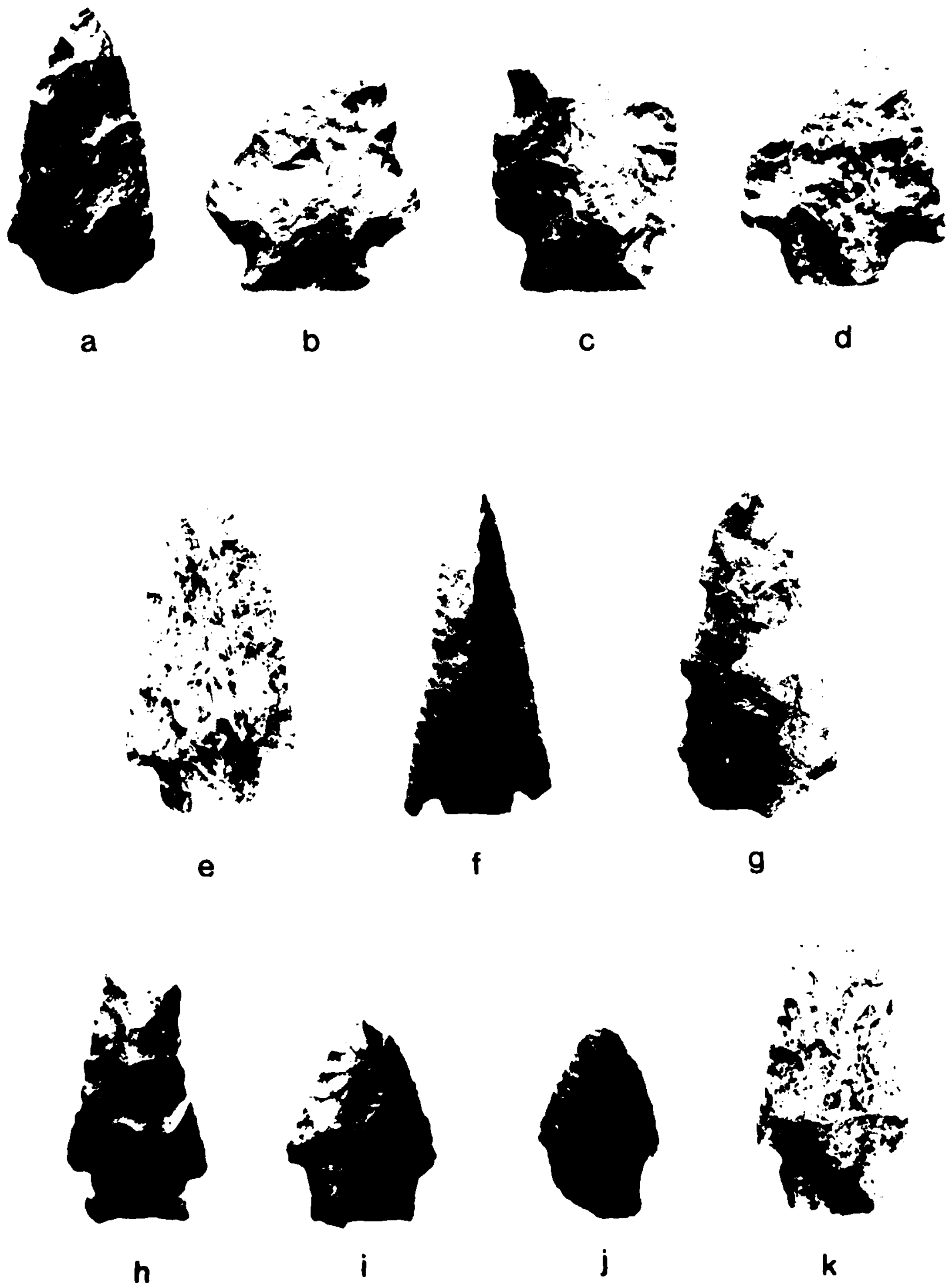
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Figure 5.35

Site 22IT539: Selected Residual Triangular, Unfinished Small Triangular, and Vaughn Projectile Point/Knives

Residual Triangular
a. (3383-1)
b. (3147-1)
c. (5211-7)
d. (5679-1)
e. (3503-1)
f. (3377-1)
g. (4820-1)

Uniface Small Triangular
h. (1386-66)
i. (1642-68)
j. (1394-81)
k. (1902-141)
l. (1730-2)

Vaughn
m. (3170-5)
n. (1953-21)
o. (1406-75)
p. (2999-1)

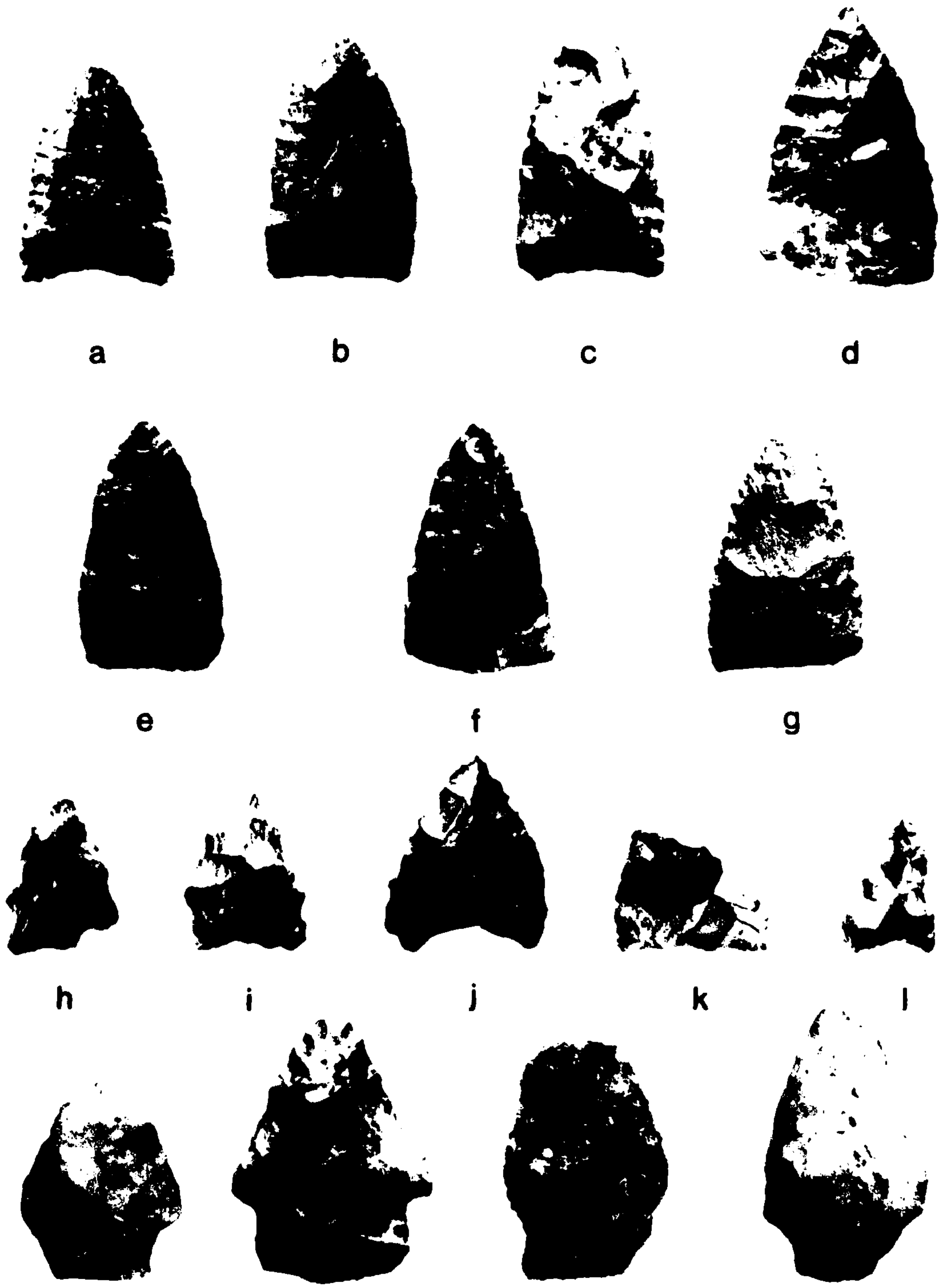
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Figure 5.36

Site 22IT539: Selected Sykes-White Springs Projectile Point/Knives

a. (4897-1)
b. (5074-1)
c. (3144-1)
d. (5085-1)
e. (1870-23)
f. (4687-1)
g. (2884-1)
h. (4691-1)
i. (5720-2)
j. (4643-2)
k. (5085-2)
l. (1920-32)
m. (3173-2)
n. (5720-1)
o. (2756-5)
p. (3192-88)
q. (5678-1)
r. (3302-2)
s. (5024-1)
t. (1827-25)
u. (5019-1)
v. (2374-24)
w. (6165-1)

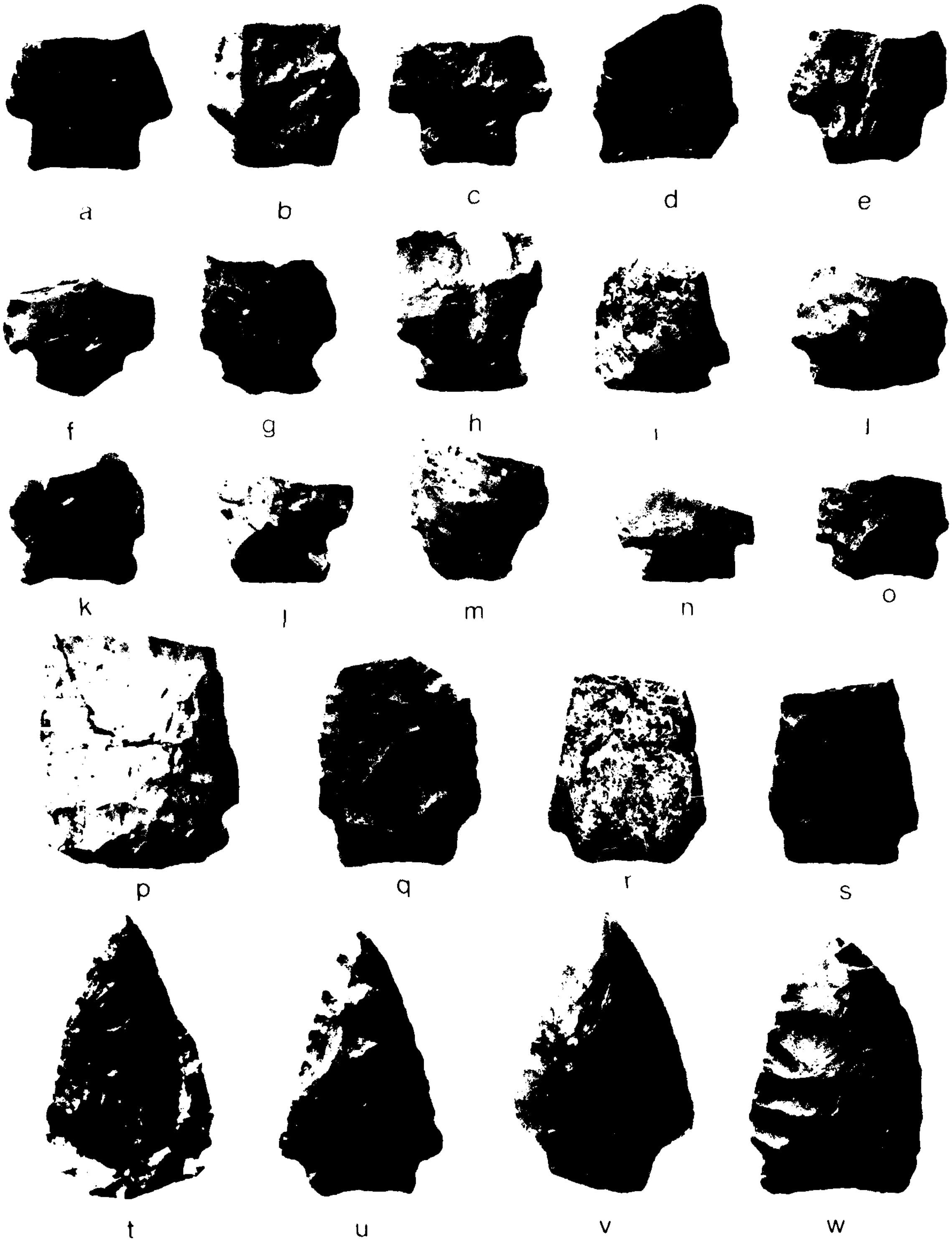
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Figure 5.37

Site 22IT539: Selected Biface Blades

a. Ovoid Biface on a Flake (5605-6)
b. Ovoid Biface on Other (5259-1)
c. Ovoid Biface on Other (1478-2)
d. Ovoid Biface on Other (5287-1)
e. Ovoid Biface on Other (5860-2)
f. Triangular Biface on a Flake (611-1)
g. Triangular Biface on a Flake (3503-4)
h. Triangular Biface on a Flake (6152-1)
i. Triangular Biface on a Flake (5723-2)

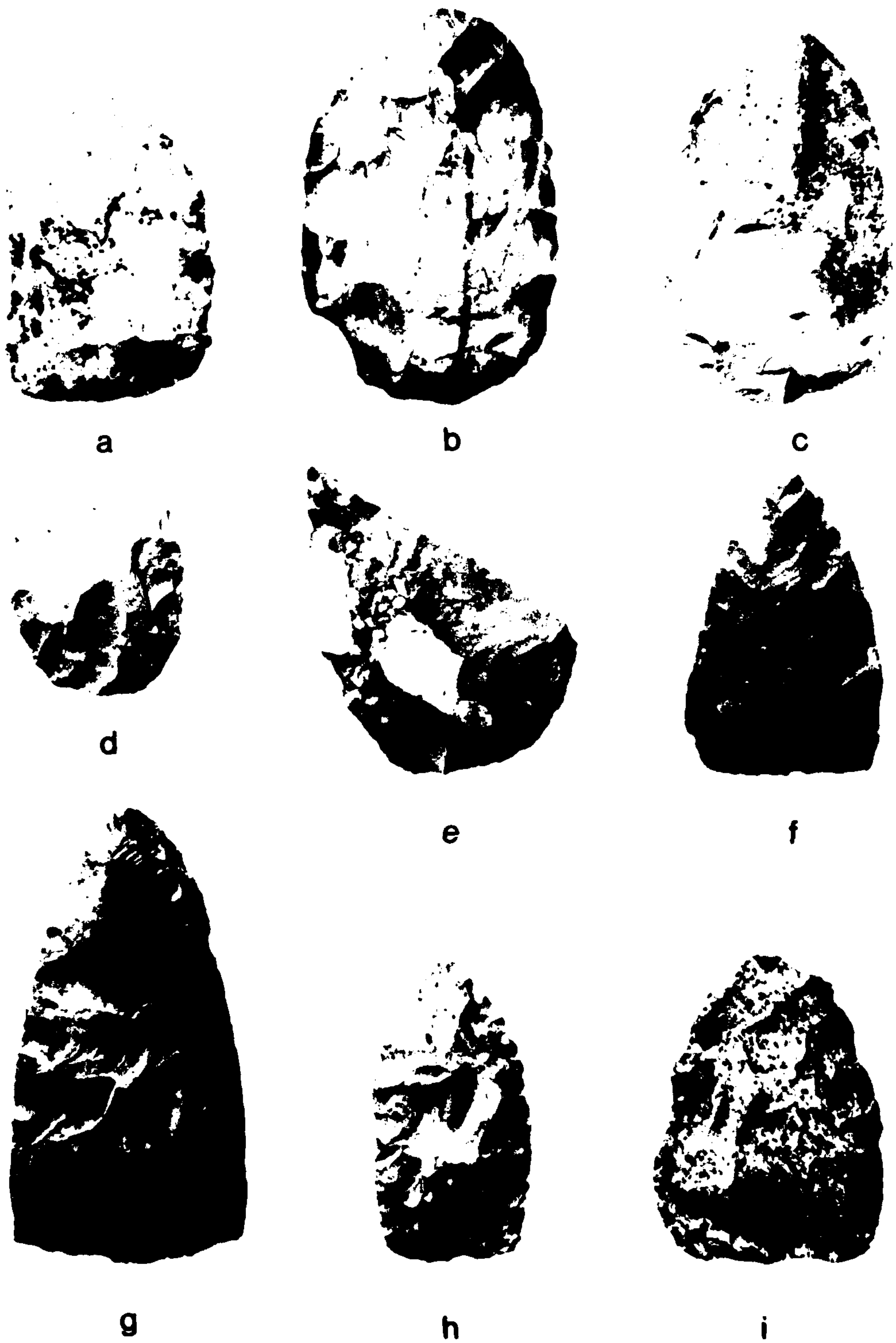
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Figure 5.38

Site 22IT539: Selected Biface Blades

a. Triangular Biface on Other (5726-5)
b. Triangular Biface on Other (5073-6)
c. Triangular Biface on Other (5605-8)
d. Triangular Biface on Other (3492-3)
e. Triangular Biface on Other (5664-6)
f. Triangular Biface on Other (2524-4)
g. Narrow Triangular Biface on Other (2338-8)
h. Expanding Triangular Biface on Other (1578-3)
i. Expanding Triangular Biface on Other (3262-3)
j. Broad Based Triangular Biface on Other (1441-2)
k. Broad Based Triangular Biface on Other (5911-1)
l. Broad Based Triangular Biface on Other (4901-3)
m. Broad Based Triangular Biface on Other (6028-1)
n. Broad Based Triangular Biface on Other (5605-7)

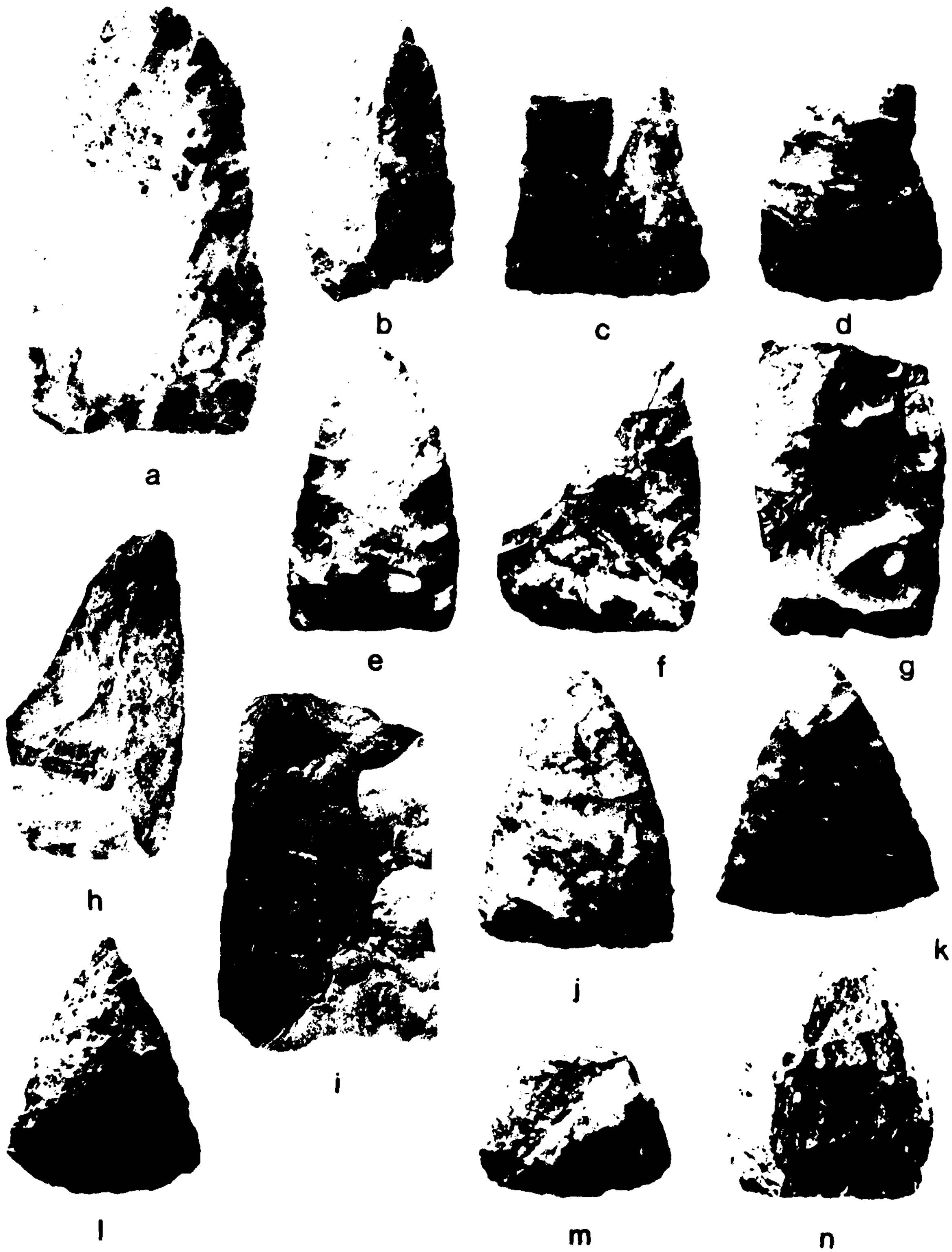

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Figure 5.39

Site 2IT539: Selected Biface Blades and Preforms

Biface Blades
- a. Biface Blade Other (5728-2)
- b. Rehafted Biface Blade on Other (5676-1)
- c. Rehafted Biface Blade on Other (5219-1)
- d. Rehafted Biface Blade on Other (5296-1)
- e. Rehafted Biface Blade on Other (5522-4)

Preforms
- f. Preform I on a Cobble (5085-7)
- g. Preform I on a Cobble (5606-2)
- h. Preform I on a Cobble (2391-52)
- i. Preform I on Indeterminate (2320-7)
- j. Preform I on Indeterminate (1687-7)
- k. Preform I on Indeterminate (3363-2)
- l. Preform I on Indeterminate (1426-8)
- m. Preform I on Indeterminate (1518-4)
- n. Preform I on Indeterminate (5727-4)


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Figure 5.40

Site 22IT539: Selected Preform Two's

a. Preform II on a Flake (5194-5)
b. Preform II on a Flake (5727-6)
c. Preform II on a Flake (3562-10)
d. Preform II on a Flake (5763-2)
e. Preform II on Indeterminate (5663-3)
f. Preform II on Indeterminate (5173-3)
g. Preform II on Indeterminate (5727-7)
h. Preform II on Indeterminate (5725-7)
i. Preform II on Indeterminate (1795-23)
j. Preform II on Indeterminate (3562-8)

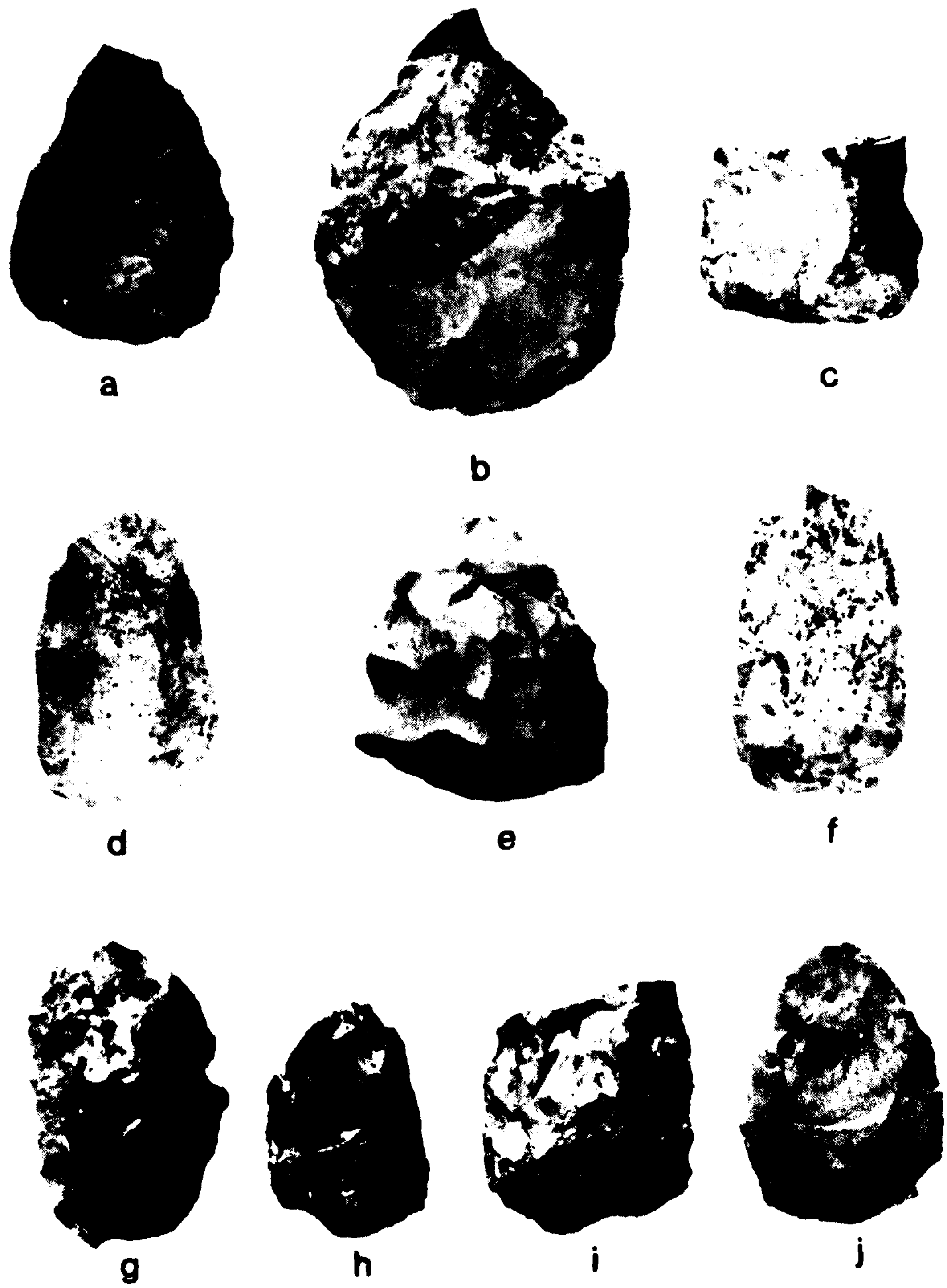
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Figure 5.41

Site 22IT539: Preform Quarry Blades

a. (4609-1)
b. (4613-1)
c. (4610-1)
d. (4612-1)
e. (4614-1)
f. (5778-1)
g. (5779-1)

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Figure 5.42

Site 22IT539: Selected Cores

a. 90° Unifacial (1538-1)
b. 90° Unifacial (5044-5)
c. 90° Unifacial (2036-40)
d. 90° Unifacial (1813-2)
e. 90° Bifacial (5298-1)
f. 90° Bifacial (3199-3)
g. 90° Bifacial (3552-1)
h. 180° Unifacial Opposing (4713-2)

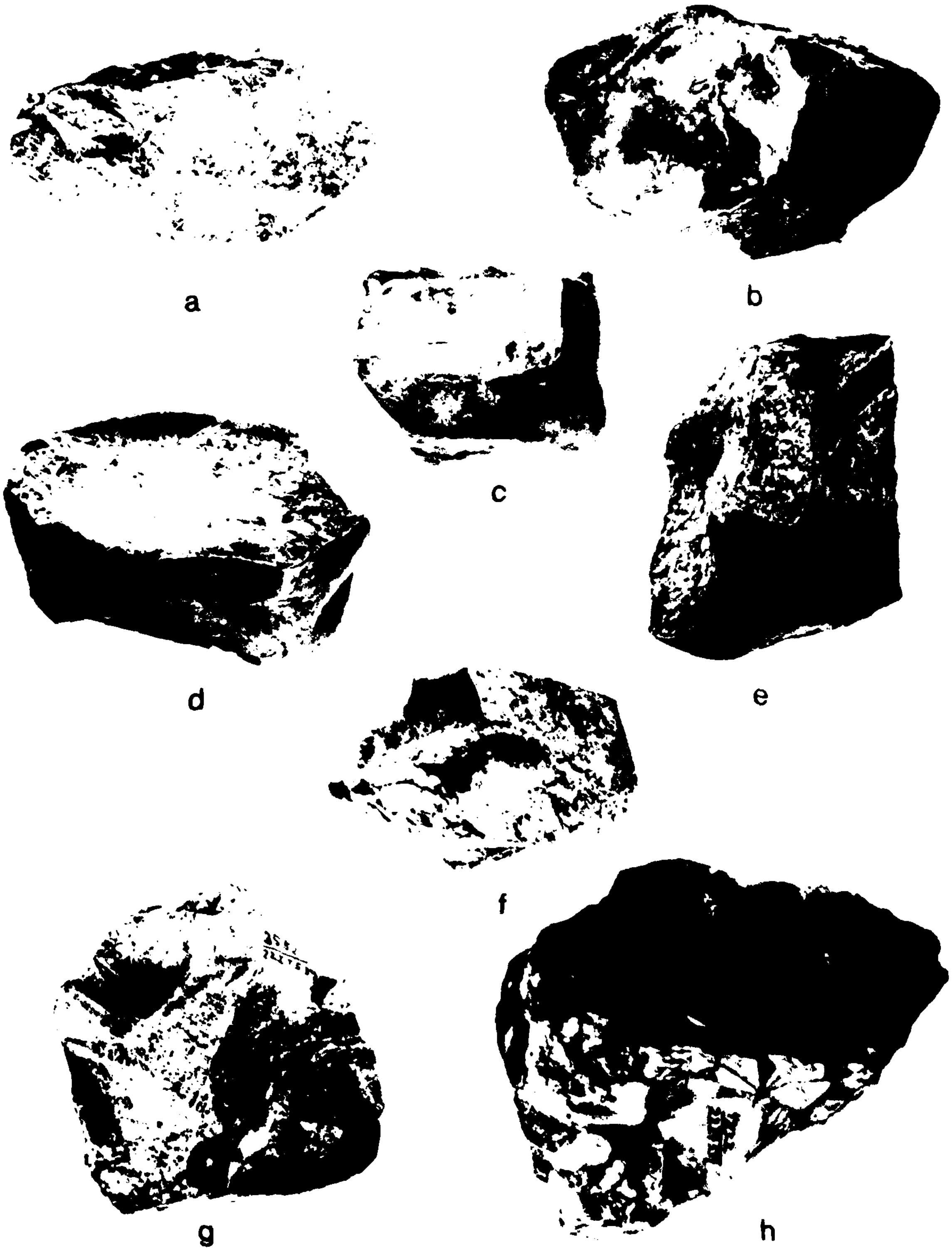
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Figure 5.43

Site 22IT539: Selected Cores

a. 180° Unifacial Opposing (2907-1)
b. 180° Unifacial Adjacent (4647-9)
c. 180° Unifacial Adjacent (5763-3)
d. 270° Unifacial (5358-1)
e. 270° Unifacial (5641-1)
f. 270° Unifacial (5418-1)
g. 270° Unifacial (3290-4)
h. 270° Bifacial (6138-1)

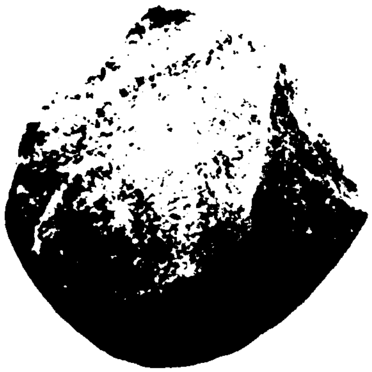

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Figure 5.44

Site 22IT539: Selected Cores

a. 360° Unifacial (5085-8)
b. 360° Unifacial (1584-23)
c. 360° Unifacial (5492-1)
d. 360° Unifacial (3486-2)
e. 360° Bifacial (2389-1)
f. Bipolar Core (5844-6)
g. Bipolar Core (5875-1)
h. Bipolar Core (3261-198)
i. Blade Core (3562-11)
j. Microblade Core (1577-47)
k. Core Other (5869-3)

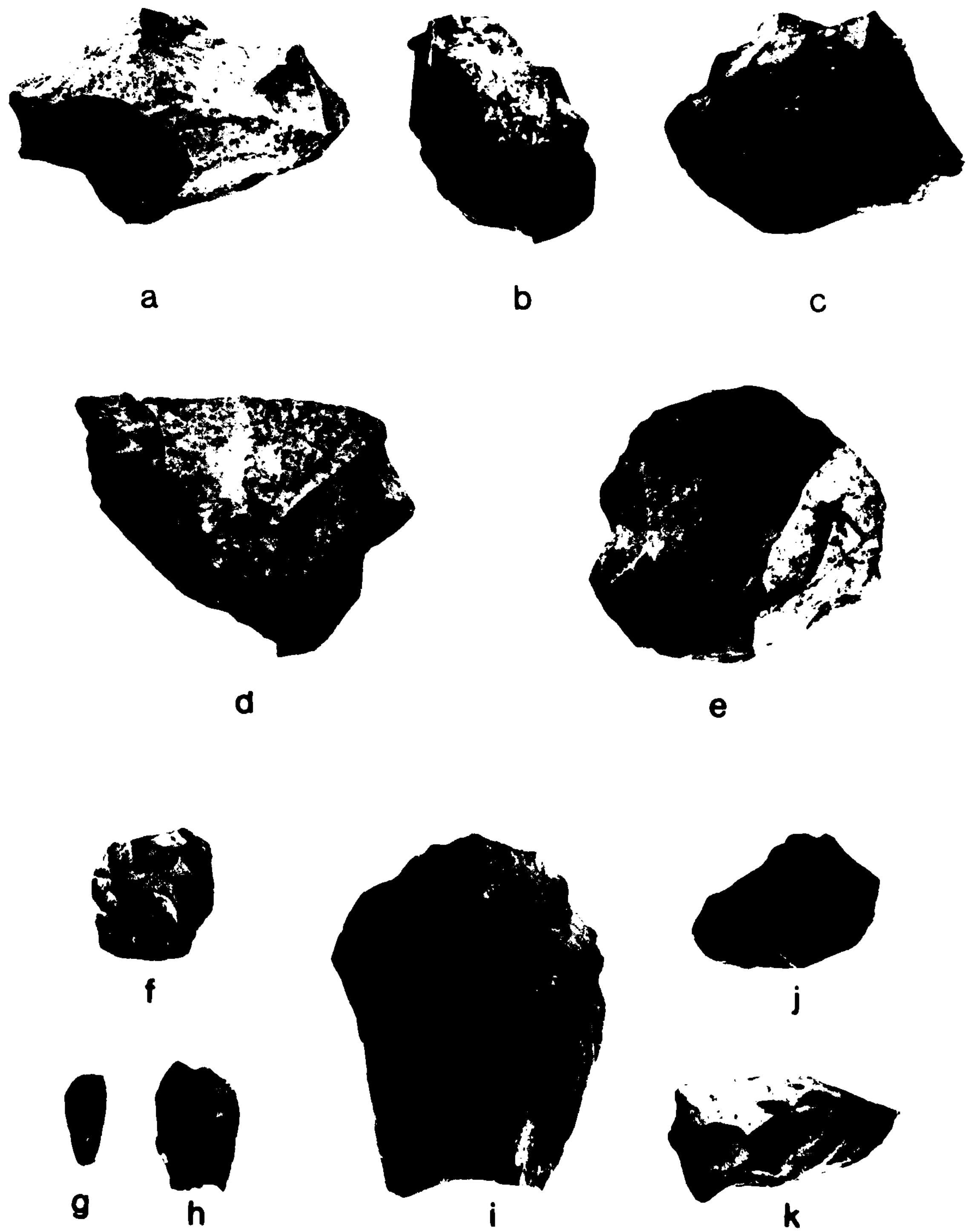
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Figure 5.45

Site 22IT539: Selected Scrapers

a. Uniface Side Scraper on Blade/Blade-Like Flake (1396-63)
b. Uniface Side Scraper on Blade/Blade-Like Flake (4708-5)
c. Uniface Side Scraper on Blade/Blade-Like Flake (5896-2)
d. Uniface End Scraper on Blade/Blade-Like Flake (1915-54)
e. Uniface End Scraper on Blade/Blade-Like Flake (5173-4)
f. Uniface Side Scraper on Expanding Flake (3315-2)
g. Uniface Side Scraper on Expanding Flake (4748-3)
h. Uniface Side Scraper on Expanding Flake (4826-2)
i. Uniface Side Scraper on Expanding Flake (6192-1)
j. Uniface Side Scraper on Expanding Flake (5664-10)
k. Uniface End Scraper on Expanding Flake (4683-1)
l. Uniface End Scraper on Expanding Flake (4713-3)
m. Uniface End Scraper on Expanding Flake (5521-7)
n. Uniface End Scraper on Expanding Flake (3297-5)
o. Uniface End Scraper on Expanding Flake (5725-9)
p. Uniface Side Scraper on Other Flake (4713-4)
q. Uniface Side Scraper on Other Flake (4631-4)
r. Uniface Side Scraper on Other Flake (4631-5)

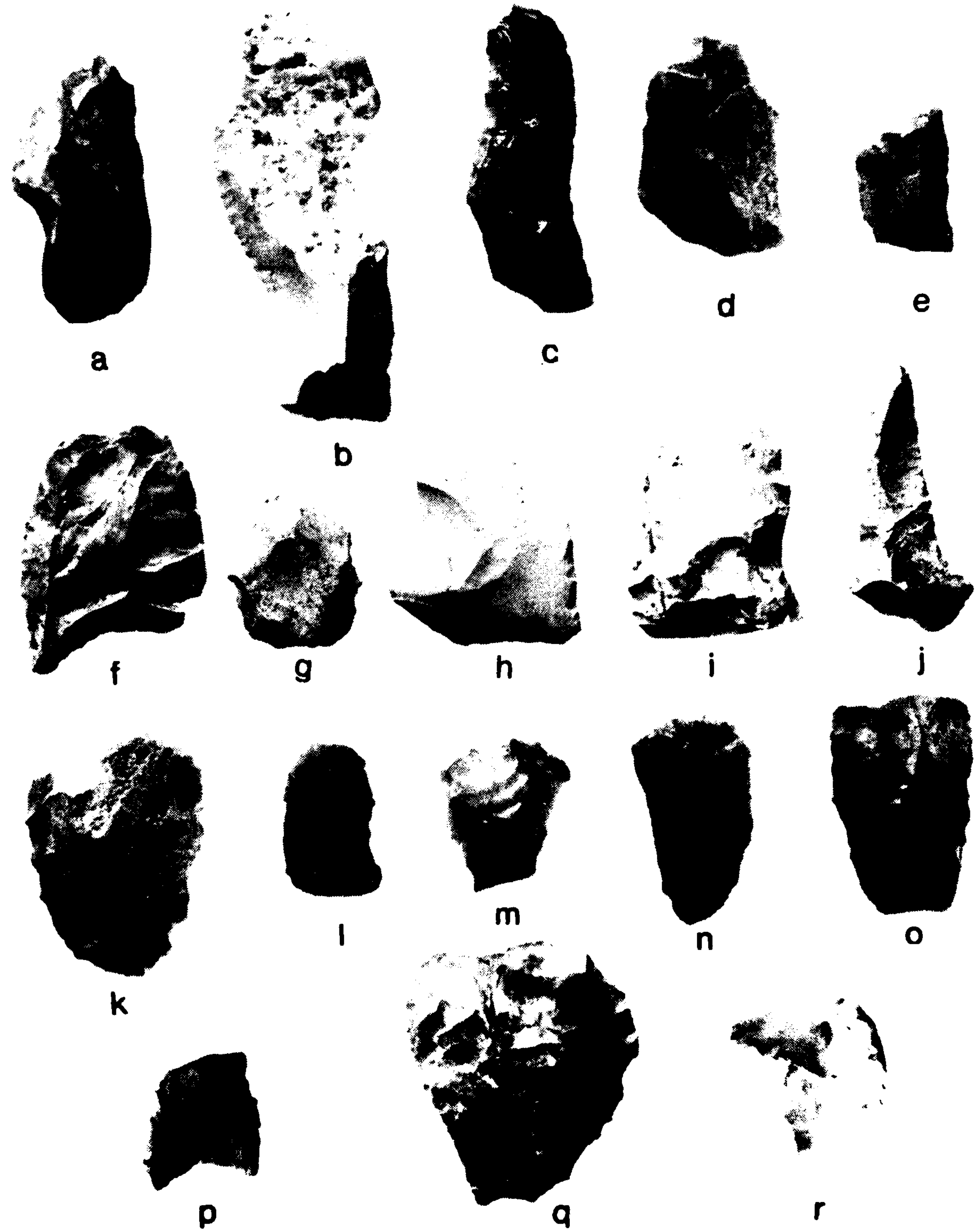
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Figure 5.46

Site 22IT539: Selected Scrapers

a. Uniface End Scraper on Other Flake (2796-5)
b. Uniface End Scraper on Other Flake (5727-12)
c. Uniface End Scraper on Other Flake (5869-4)
d. Uniface End Scraper on Other Flake (5896-4)
e. Uniface End Scraper on Other Flake (4712-2)
f. Uniface End Scraper on Other Flake (5112-11)
g. Uniface End Scraper on Other Flake (4631-6)
h. Biface Hafted End Scraper (3310-12)
i. Uniface Cobble Scraper (1541-44)
j. Scraper on Biface (Recycled) (3193-8)
k. Scraper on Biface (Recycled) (5728-3)
l. Scraper on Biface (Recycled) (3162-2)
m. Scraper on Biface (Recycled) (1492-1)
n. Scraper on a Core (3417-3)
o. Notched Flake/Spokeshave (4701-3)
p. Notched Flake/Spokeshave (5087-6)
q. Notched Flake/Spokeshave (3290-3)
r. Scraper Other (5503-2)
s. Ovoid Biface Scraper (3294-1)
t. Ovoid Biface Scraper (5086-3)
u. Biface Scraper on a Flake (2528-9)
v. Biface Scraper on a Flake (5769-3)
w. Graver/Scraper (5605-11)

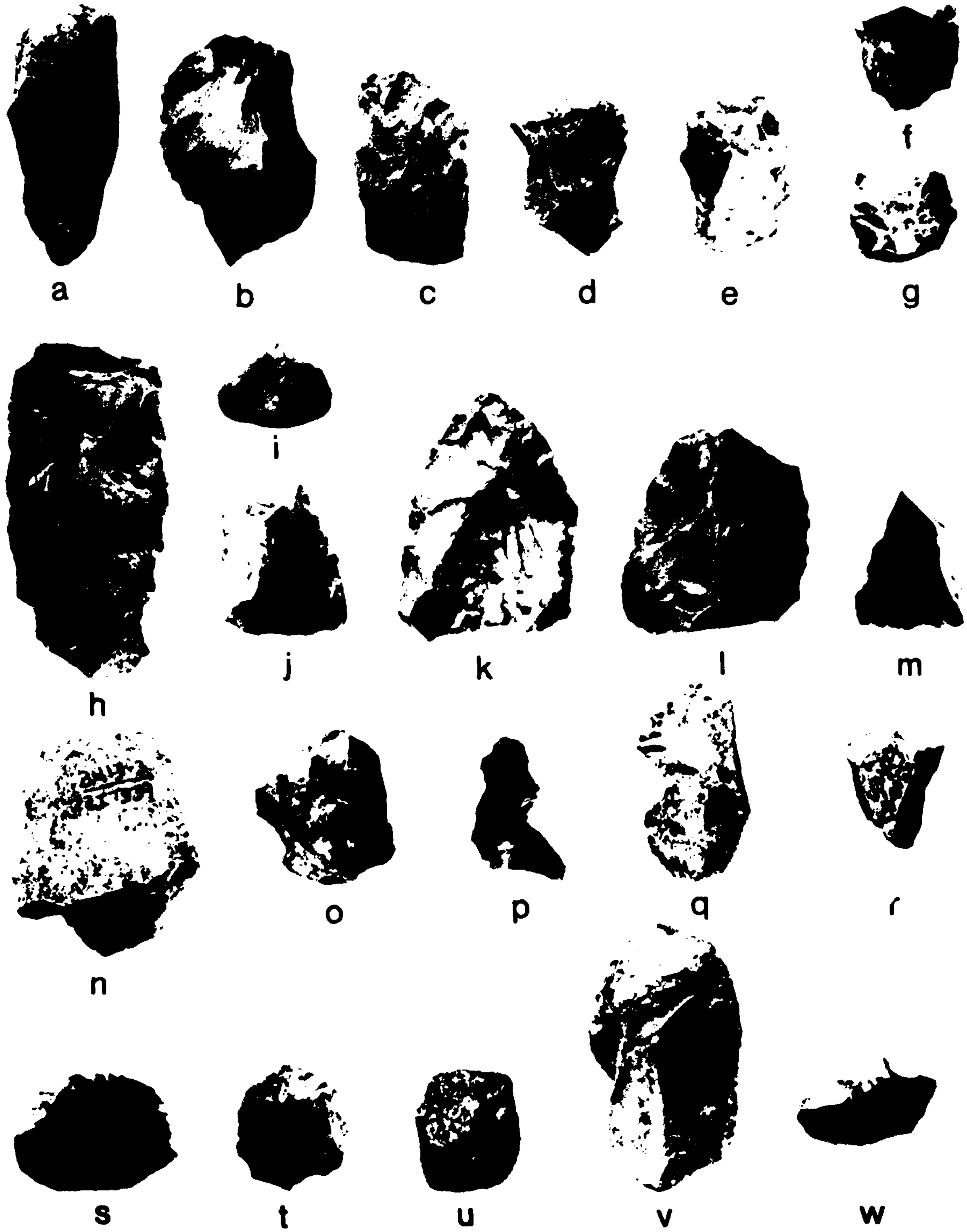
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Figure 5.47

Site 22IT539: Selected Scrapers and Drills

a. Uniface Hafted End Scraper (5597-13)
b. Uniface Hafted End Scraper (5728-5)
c. Uniface Hafted End Scraper (3562-12)
d. Notched Flake/Spokeshave (Recycled) (5153-5)
e. Hafted End Scraper (Recycled) (5726-4)
f. Hafted End Scraper (Recycled) (4840-6)
g. Hafted End Scraper (Recycled) (1406-81)
h. Hafted End Scraper (Recycled) (4701-2)
i. Hafted End Scraper (Recycled) (4840-6)
j. Hafted End Scraper (Recycled) (5763-7)
k. Hafted End Scraper (Recycled) (5726-4)
l. Shaft Drill (1344-85)
m. Shaft Drill (2844-1)
n. Shaft Drill (5186-1)
o. Shaft Drill (2560-14)
p. Shaft Drill (5441-1)
q. Shaft Drill (3080-3)
r. Shaft Drill (4870-1)

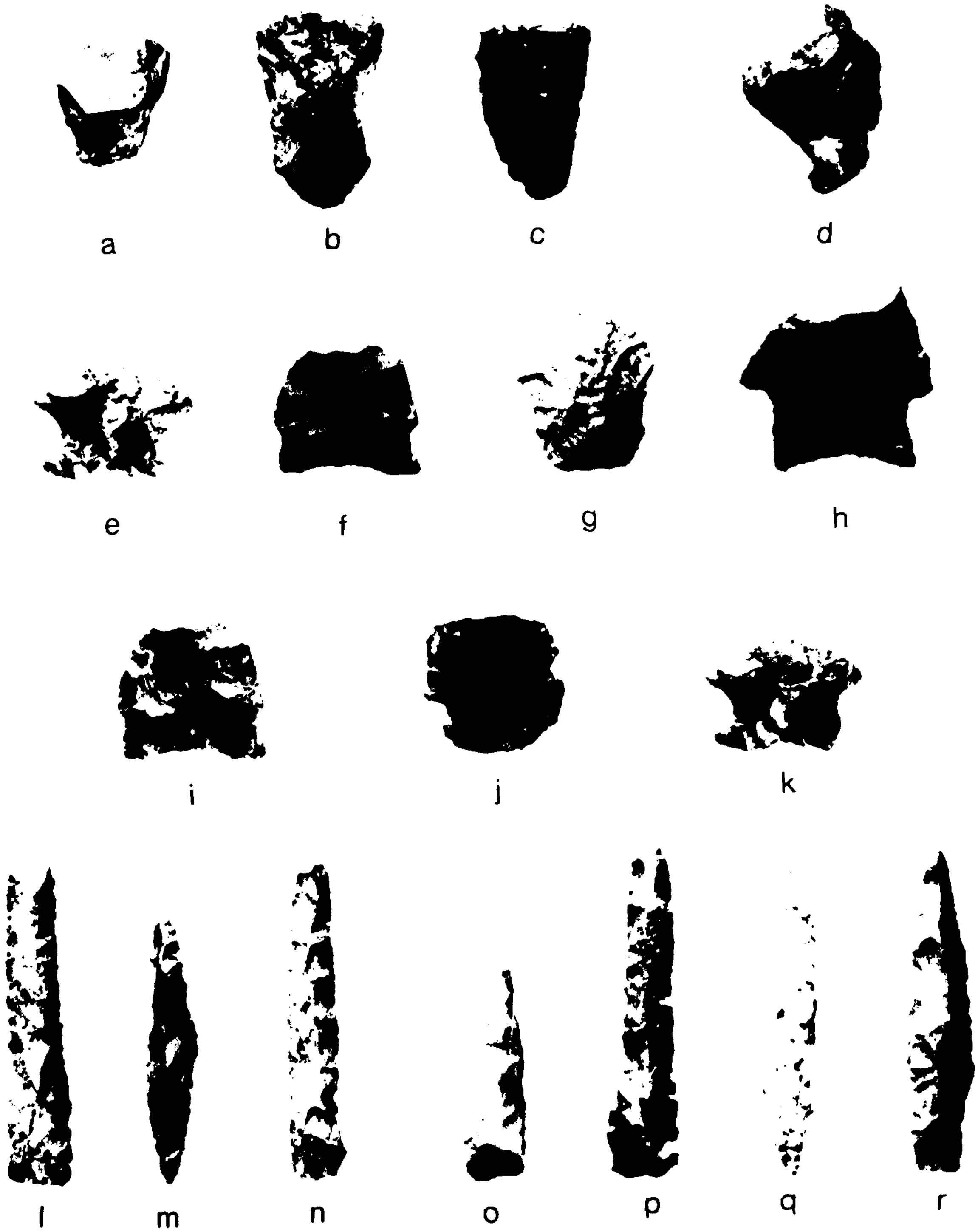
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Figure 5.48

Site 22IT539: Selected Drills and Reamers

a. Expanding Base Drill (5670-8)
b. Expanding Base Drill (5723-9)
c. Expanding Base Drill (1466-2)
d. Expanding Base Drill (2043-18)
e. Expanding Base Drill (1908-38)
f. Expanding Base Drill (2415-1)
g. Expanding Base Drill (1597-114)
h. Expanding Base Drill (1392-44)
i. Expanding Base Drill (2013-39)
j. Expanding Base Drill (2431-4)
k. Expanding Base Drill (5348-7)
l. Expanding Base Drill (1597-113)
m. Expanding Base Drill (2037-20)
n. Reamer (5849-4)
o. Reamer (5325-4)
p. Reamer (3282-8)
q. Reamer (2035-18)
r. Reamer (5286-1)

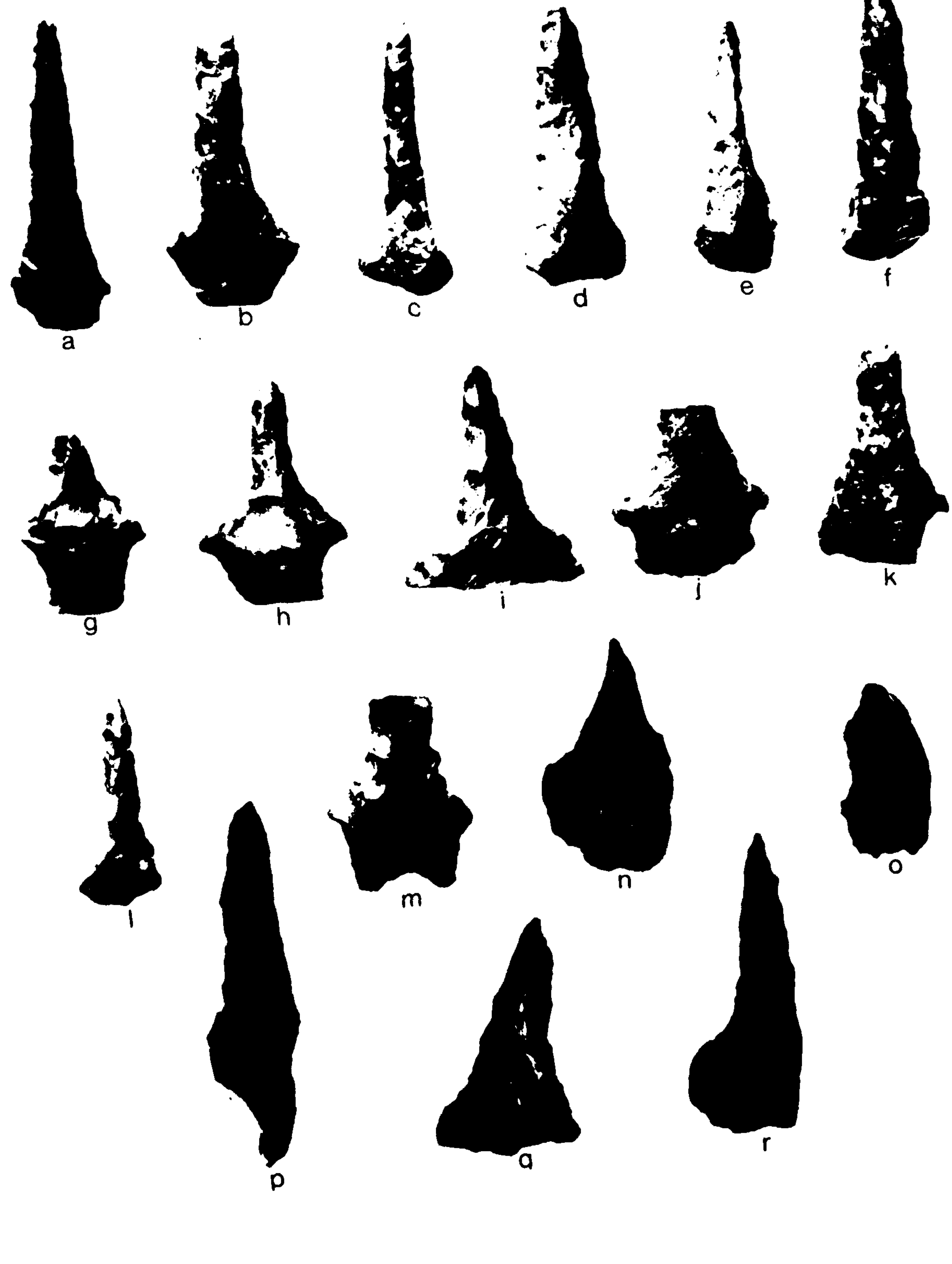
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Figure 5.49

Site 22IT539: Selected Drills, Perforators, Etc. and Uniface Choppers

a. Perforator (2559-3)
b. Perforator (5034-5)
c. Perforator (5725-11)
d. Perforator (1791-21)
e. Perforator (5606-486)
f. Perforator (3322-20)
g. Perforator (1940-36)
h. Perforator (1386-69)
i. Graver (5348-8)
j. Graver (1541-46)
k. Graver (2511-4)
l. Graver (1387-82)
m. Microlith (5606-9)
n. Microlith (5603-4)
o. Microlith (1385-146)
p. Microlith (2931-9)
q. Denticulate (14-363)
r. Denticulate (1396-64)
s. Denticulate (4821-10)
t. Reamer (Recycled) (5153-2)
u. Perforator (Recycled) (3239-2)
v. Uniface Chopper (3314-10)
w. Uniface Chopper (2593-3)
x. Uniface Chopper (3515-1)


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Figure 5.50

Site 22IT539: Selected Other Uniface and Biface Tools

a. Biface Chopper (2319-5)
b. Biface Chopper (3061-4)
c. Biface Chopper (5367-1)
d. Biface Chopper (5903-4)
e. Biface Adze (5903-4)
f. Biface Adze (5430-1)
g. Biface Adze (1425-7)

a

b

c

d

e

f

g

Figure 5.51

Site 22IT539: Selected Other Uniface and Biface Tools

a. Uniface Adze (5197-1)
b. Uniface Adze (5390-1)
c. Uniface Flake Knife (3562-13)
d. Uniface Flake Knife (3304-9)
e. Uniface Flake Knife (4592-8)
f. Uniface Flake Knife (5605-12)
g. Uniface Flake Knife (4708-8)
h. Biface Flake Knife (3376-4)
i. Biface Flake Knife (5152-5)
j. Biface Flake Knife (1892-21)
k. Biface Flake Knife (1596-62)
l. Uniface Cobble Knife (5763-8)

Figure 5.52

Site 22IT539: Selected Other Uniface and Biface Tools

a. Biface Cobble Knife (5896-5)
b. Biface Digging Implement (5663-16) (1:2)
c. Wedge (5764-10)
d. Wedge (5885-2)
e. Wedge (1396-69)
f. Chopper/Hammerstone (2346-22) (1:2)
g. Chisel (1832-45)
h. Chisel (5522-5)
i. Spokeshave (3204-23)
j. Splintered Wedge (Piece Esquille) (4941-1)
k. Splintered Wedge (Piece Esquille) (3152-8)
l. Splintered Wedge (Piece Esquille) (6079-3)
m. Splintered Wedge (Piece Esquille) on Biface (Recycled) (5174-16)
n. Splintered Wedge (Piece Esquille) on Biface (Recycled) (5522-12)
o. Splintered Wedge (Piece Esquille) on Biface (Recycled) (5215-20)

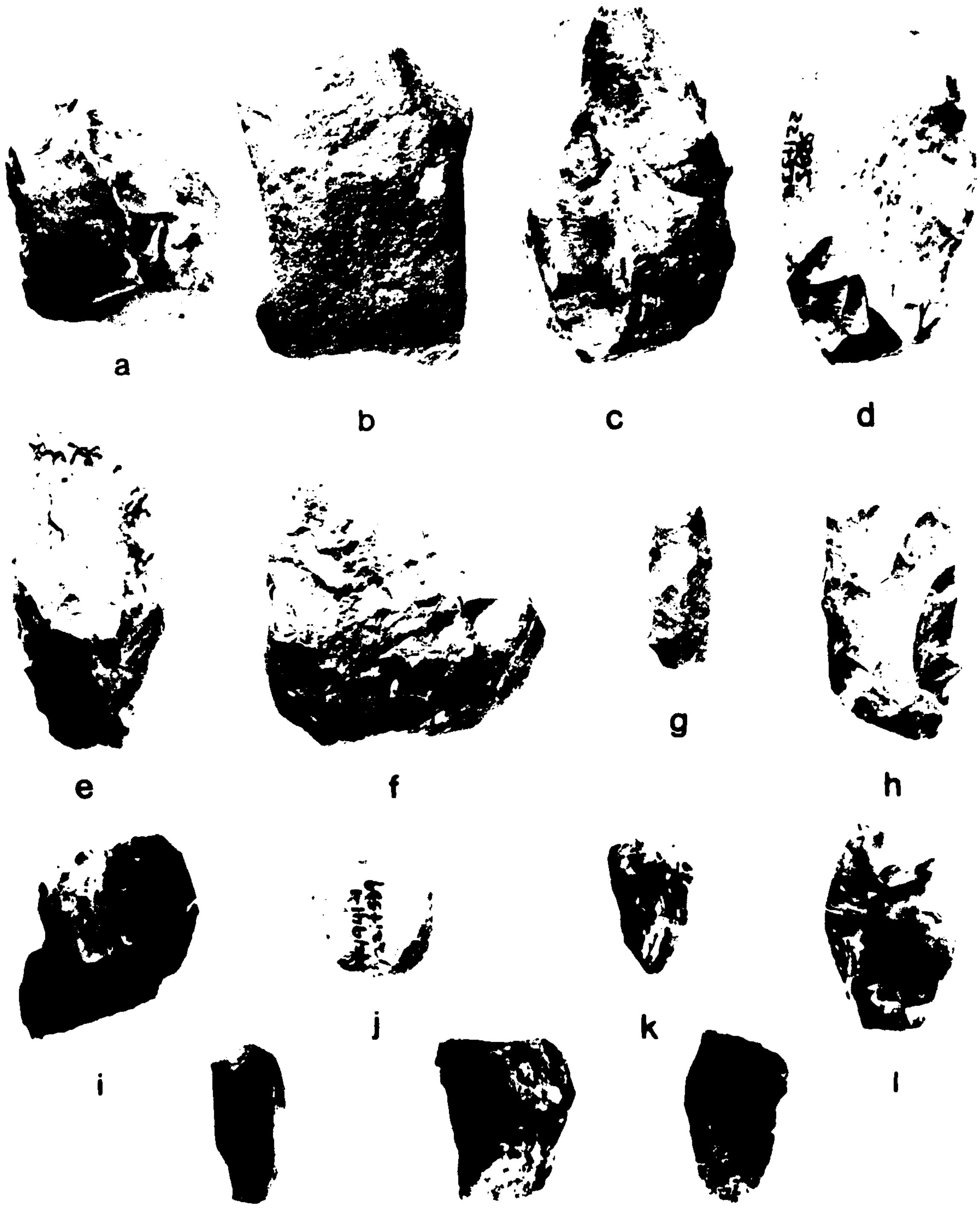

a
b
c
d
e
f
g
h
i
j
k
l
m
n
o

Figure 5.53

Site 22IT539: Selected Ground Stone Tools

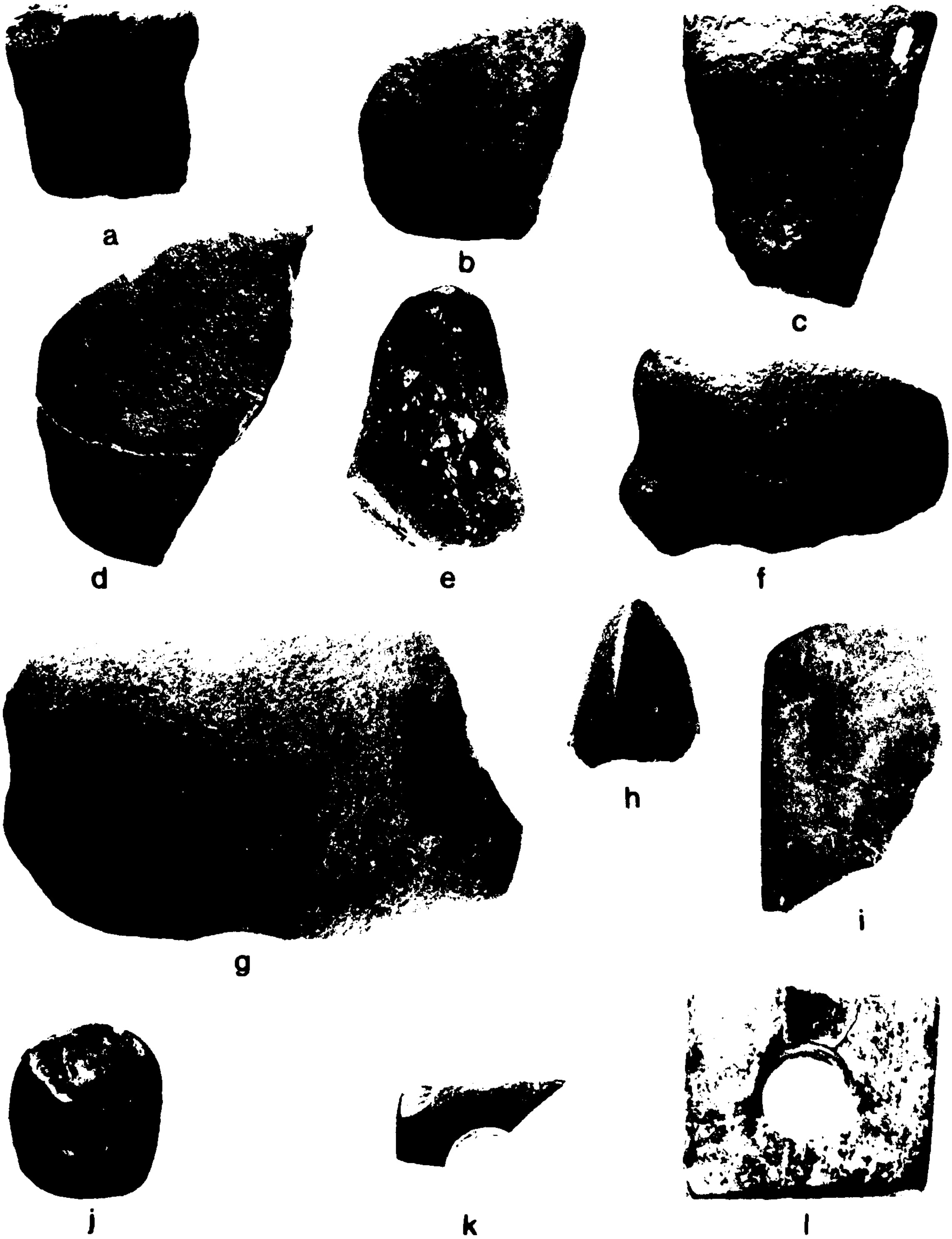
a. Hammerstone (3261-5)
b. Hammerstone (3213-7)
c. Hammerstone (3290-6)
d. Anvilstone (3332-7)
e. Pitted Anvilstone (5140-1) (1:2)
f. Pitted Anvilstone (1397-85) (1:2)
g. Hammerstone/Anvilstone (2761-27)
h. Abrader (2422-13) (1:2)
i. Abrader (4774-1) (1:2)
j. Abrader (3360-11) (1:2)


a
b
c
d
e
f
g
h
i
j

Figure 5.54

Site 22IT539: Selected Ground Stone Tools

a. Muller (3562-24) (1:2)
b. Muller (4292-19) (1:2)
c. Mortar (1582-1) (1:2)
d. Mortar (2751-149) (1:2)
e. Pestle (4776-1) (1:2)
f. Grooved Axe (1581-1) (1:2)
g. Grooved Axe (5549-1) (1:2)
h. Celt Fragment (1426-19)
i. Gorget Fragment (2481-19)
j. Unfinished Atlatl Weight (2386-1)
k. Atlatl Weight (3272-1)
l. Atlatl Weight (4842-1)

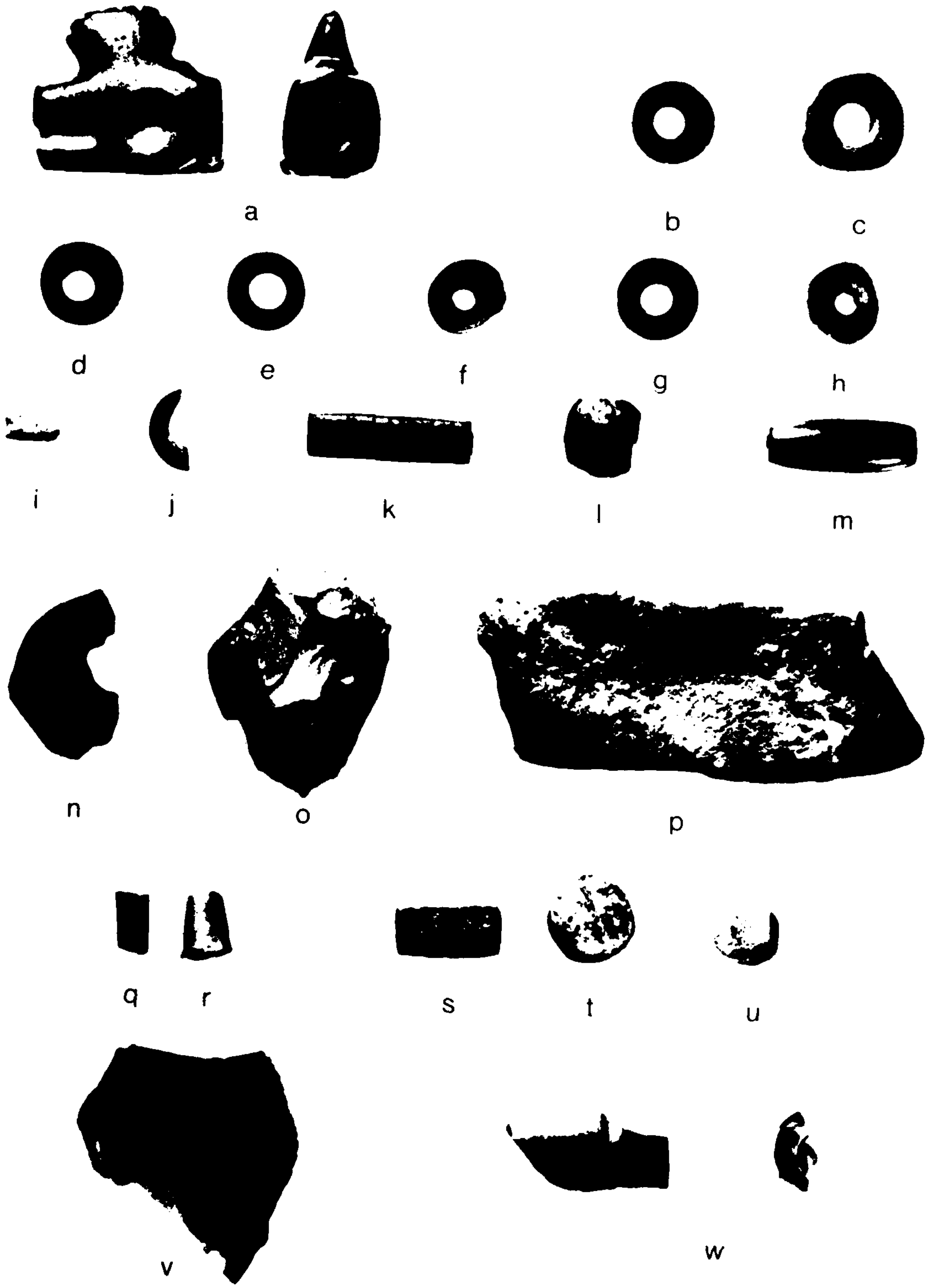


5.270

Figure 5.55

Site 22IT539: Selected Ground Stone Tools

a. Stone Bead (5800-1)
b. Stone Bead (4881-1)
c. Stone Bead (5807-1)
d. Stone Bead (4882-1)
e. Stone Bead (4881-2)
f. Stone Bead (3314-22)
g. Stone Bead (4881-3)
h. Stone Bead (2741-16)
i. Stone Bead (3272-8)
j. Stone Bead (1492-3)
k. Stone Bead (1989-53)
l. Stone Bead (1832-40)
m. Stone Bead (1868-37)
n. Worked Hollow-Sandstone (4648-12)
o. Unidentified Ground/Polished Stone Fragment (2041-70)
p. Muller/Pitted Anvilstone (6158-1) (1:2)
q. Drill Core (1837-30)
r. Drill Core (1392-55)
s. Bead Preform (2036-59)
t. Bead Preform (2679-12)
u. Bead Preform (2505-8)
v. Anvilstone/Chopper (3028-17) (1:2)
w. Pipestem Fragment (2741-17)

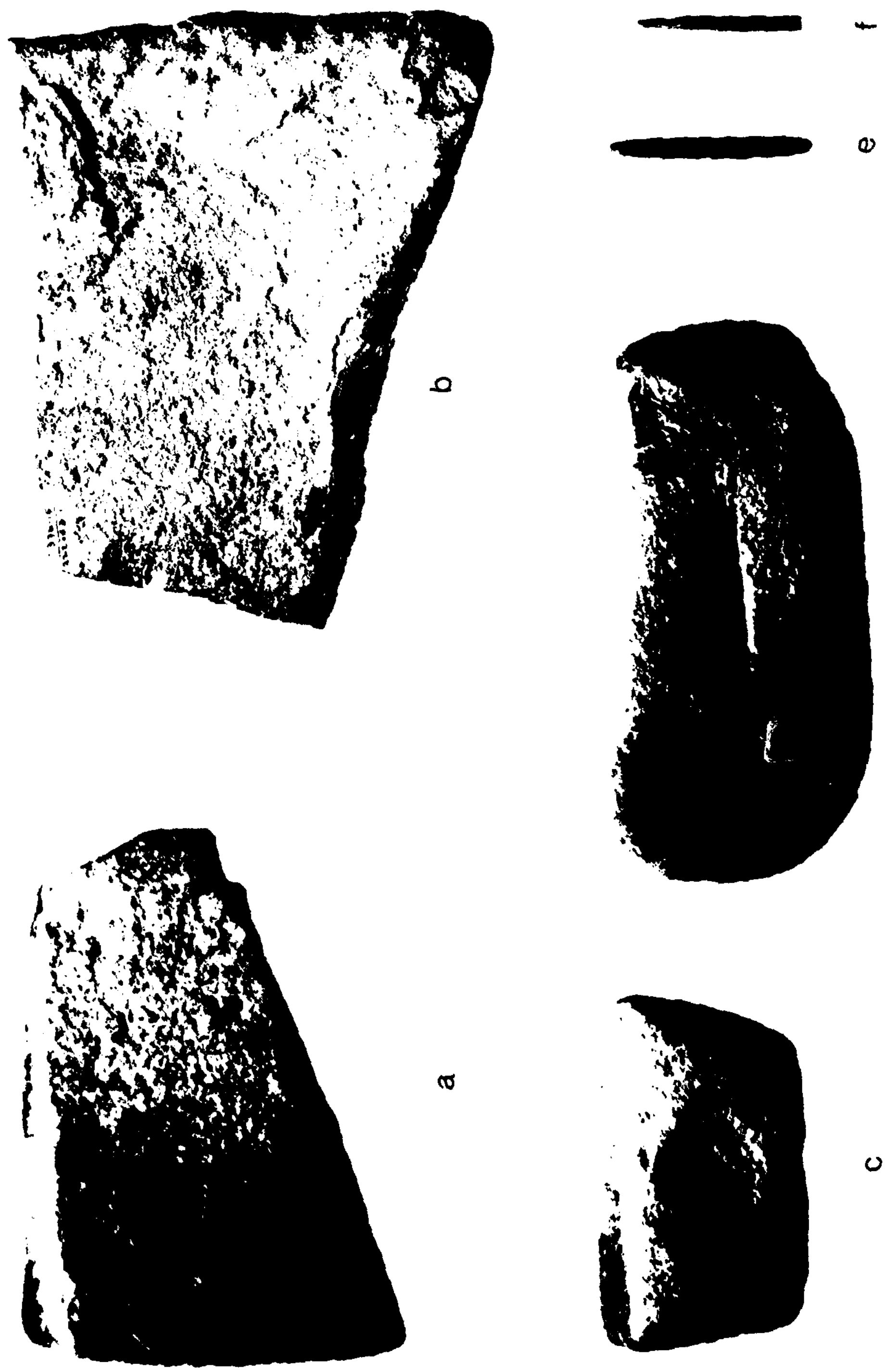


5-272

Figure 5.56

Site 22IT539: Selected Ground Stone Tools

a. Mortar/Anvilstone (5723-22) (1:2)
b. Mortar/Pitted Anvilstone (3376-15) (1:2)
c. Pitted Anvilstone/Abrader (4851-1) (1:2)
d. Grooved Abrader/Hammerstone/Pitted Anvilstone (3362-14) (1:2)
e. Awl (5038-105)
f. Awl (5215-162)



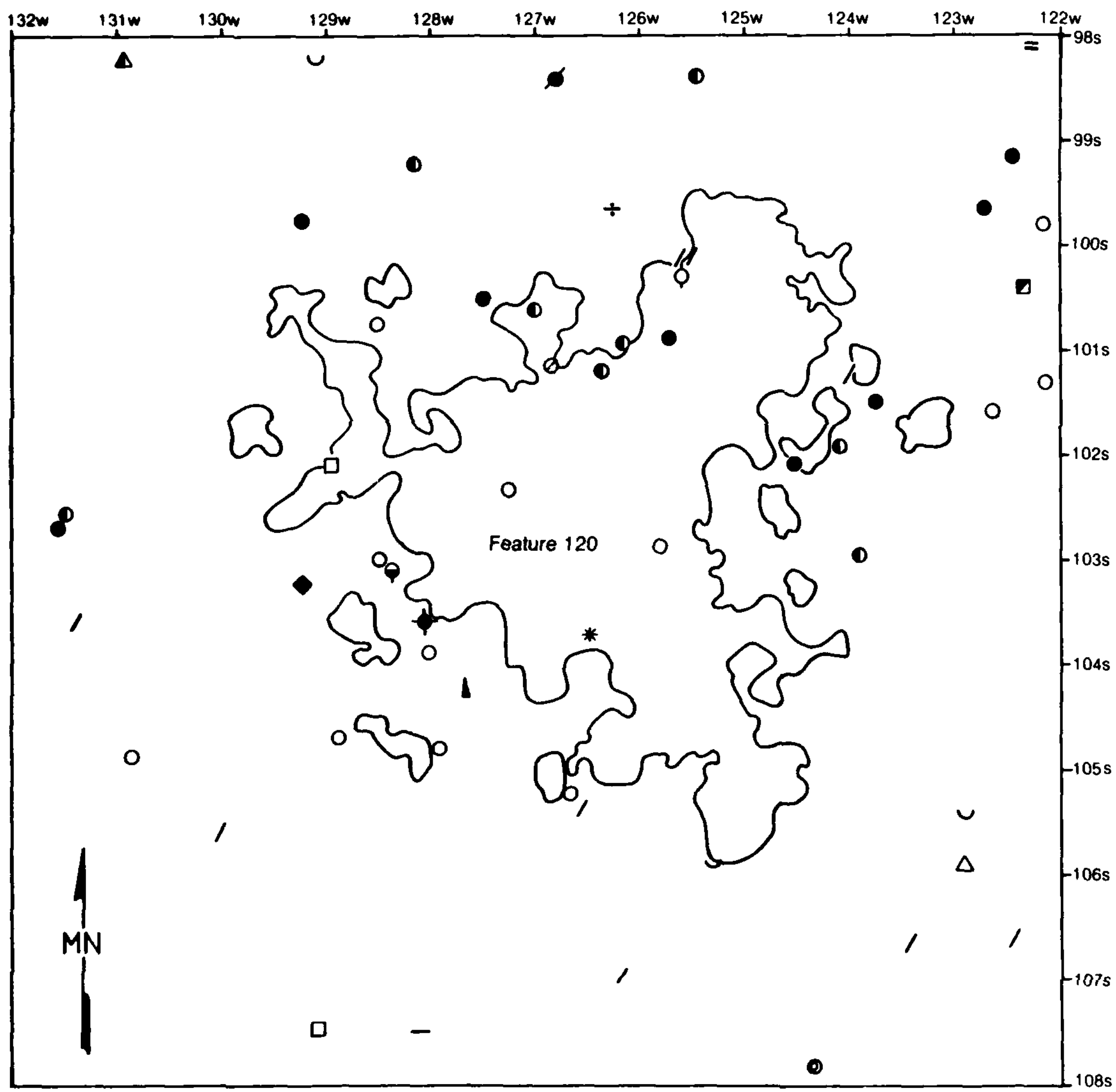
5.279

Figure 5.57

Site 2IT539: Selected Plotted Specimens from Feature 120, Level 10

BLOCK C

Selected Plotted Specimens from Feature 120 and Level 10



- ● PP/K (Benton)
- ◐ PP/K (Sykes/White Springs)
- PP/K (Residual Stemmed)
- PP/K (Morrow Mtn.)
- PP/K (Little Bear Creek)
- PP/K (Cypress Creek)
- PP/K (Kirk Corner Notched)
- ⊘ PP/K (Big Sandy)
- = hammerstone
- drill
- ✱ wedge
- □ preform II
- ◆ biface blade
- △ core
- perforator
- — anvilstone
- ○ unident. PP/K frag.
- ÷ unident. ground stone frag.
- / unident. chipped stone frag.
- drill frag.
- ◡ utilized flake

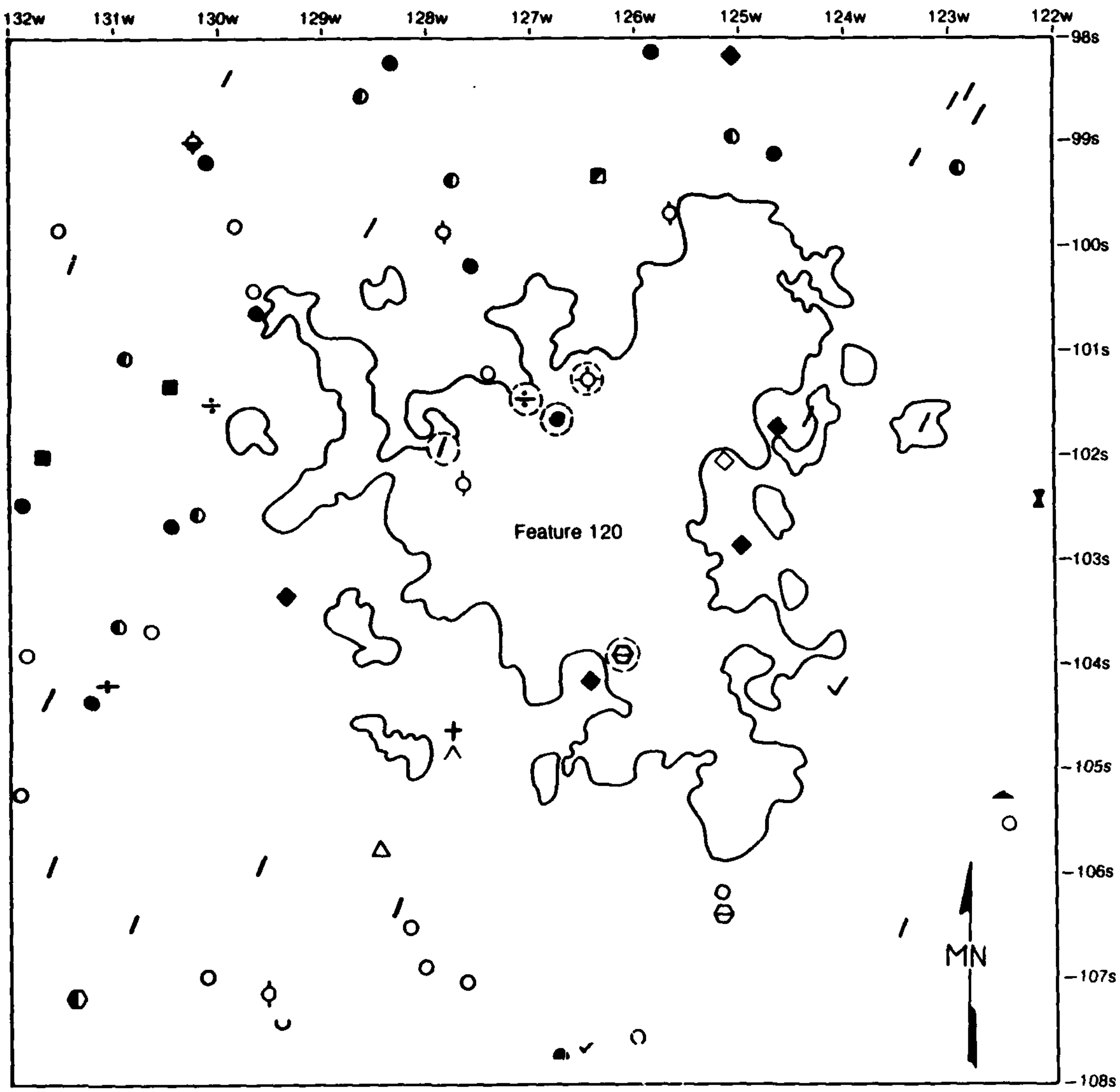
5,276

Figure 5.58

Site 22IT539: Selected Plotted Specimens from Feature 120, Level 11

BLOCK C

Selected Plotted Specimens from Feature 120 and Level 11



- PP/K (Benton)
- PP/K (Residual Stemmed)
- PP/K (Sykes/White Springs)
- PP/K (Elora)
- PP/K (Residual Triangular)
- biface blade
- preform I
- chopper
- scraper on biface frag.
- adze
- muller/anvilstone
- drill
- muller
- flake knife
- ground hematite
- piece esquille (recycled)
- utilized flake
- rehafted biface frag. - recycled
- unident PP/K frag.
- unident. scraper frag.
- unident. ground stone frag.
- unident. chipped stone frag.
- plotted specimens directly associated with Feature 120

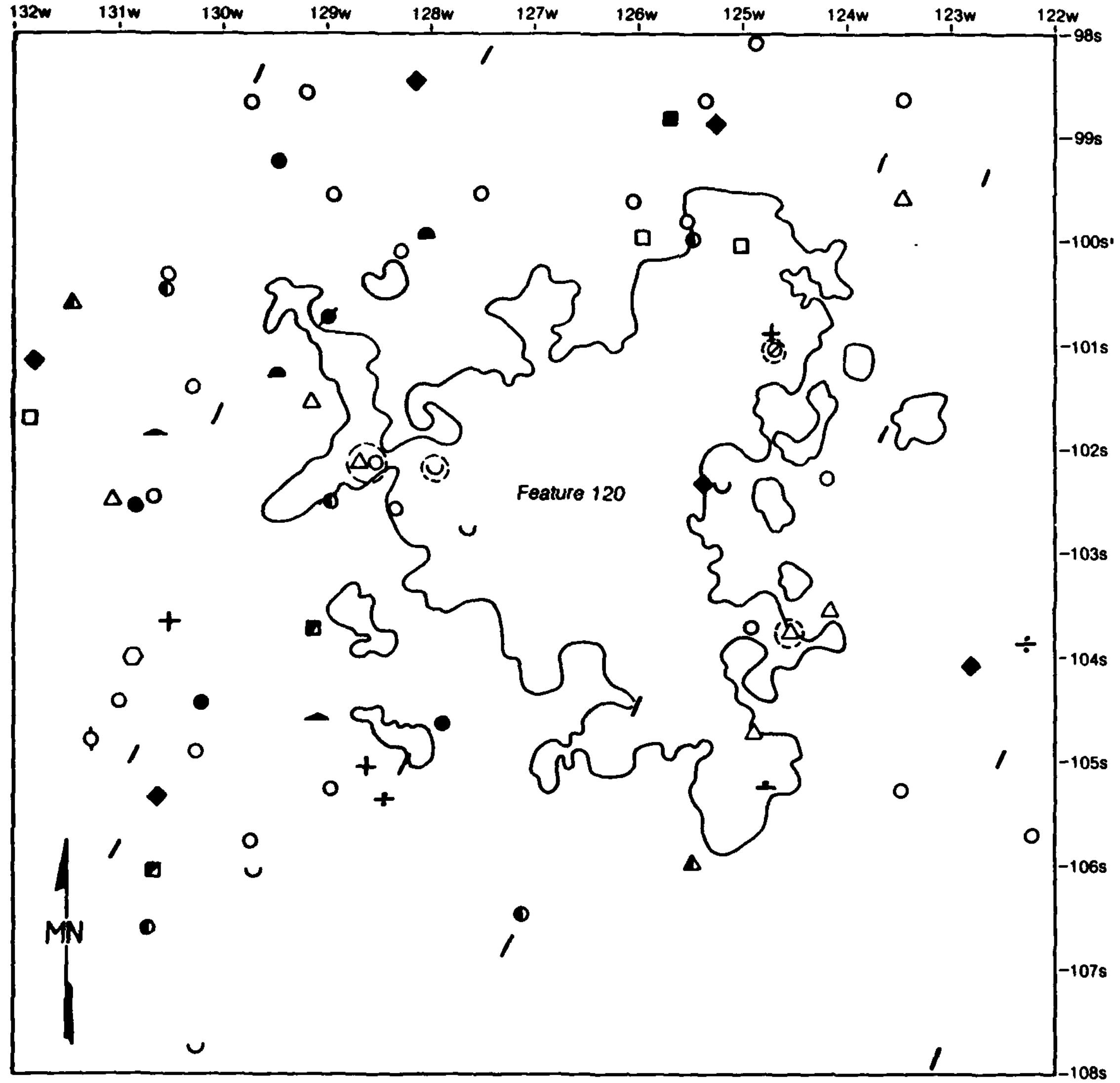
5.378

Figure 5.59

Site 22IT539: Selected Plotted Specimens from Feature 120, Level 12

BLOCK C

Selected Plotted Specimens from Feature 120 and Level 12

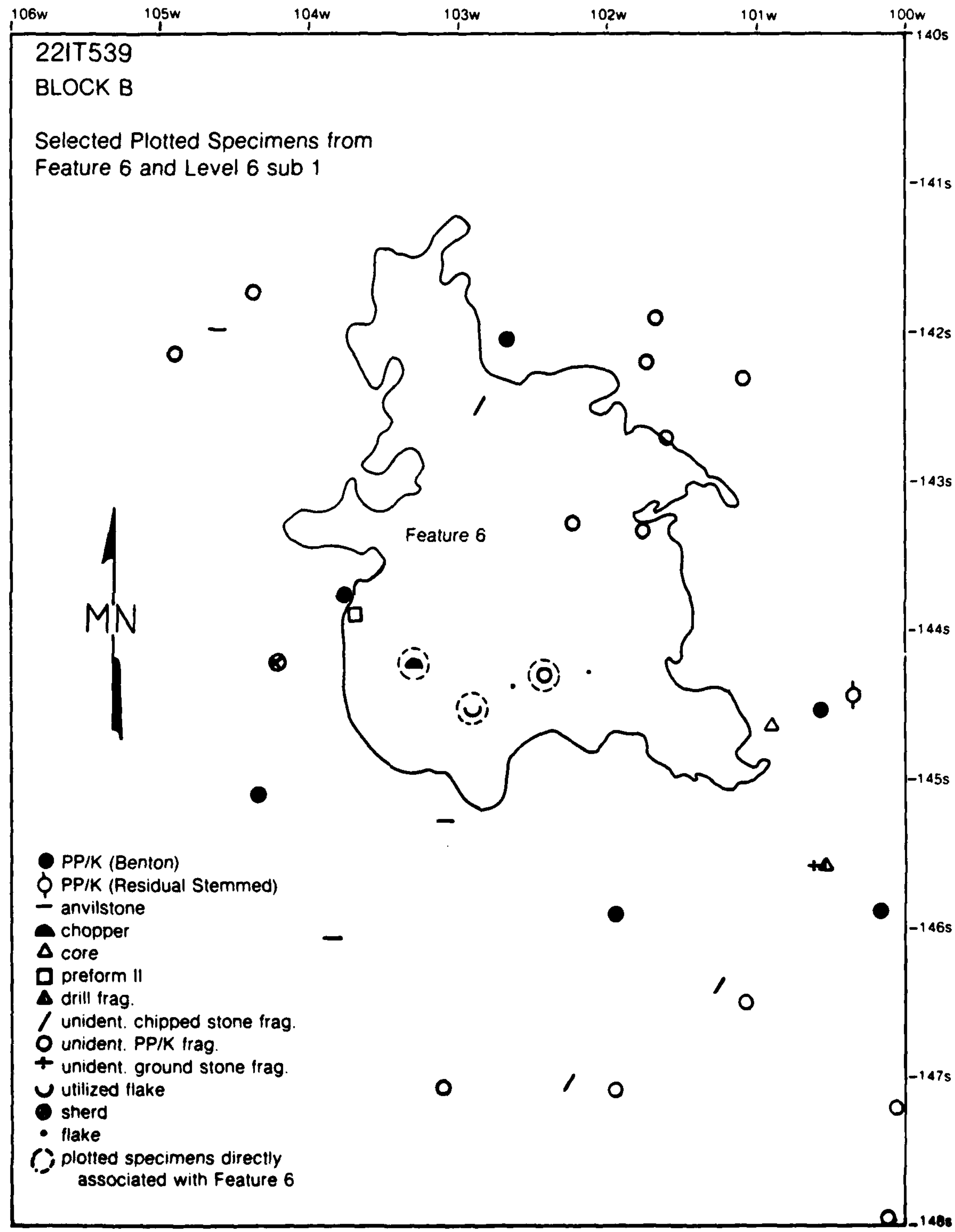


- PP/K (Benton)
- PP/K (Residual Stemmed)
- PP/K (Big Sandy)
- PP/K (Morrow Mtn.)
- PP/K (Sykes/White Springs)
- biface blade
- preform I
- preform II
- core
- chopper
- chisel
- flake knife
- adze
- drill
- muller/anvilstone
- uniface side scraper
- unident. PP/K frag.
- unident. chipped stone frag.
- unident. ground stone frag.
- drill frag.
- utilized flake
- plotted specimens directly associated with Feature 120

5.380

Figure 5.60

Site 22IT539: Selected Plotted Specimens from Feature 6, Level 6, Sublevel 1

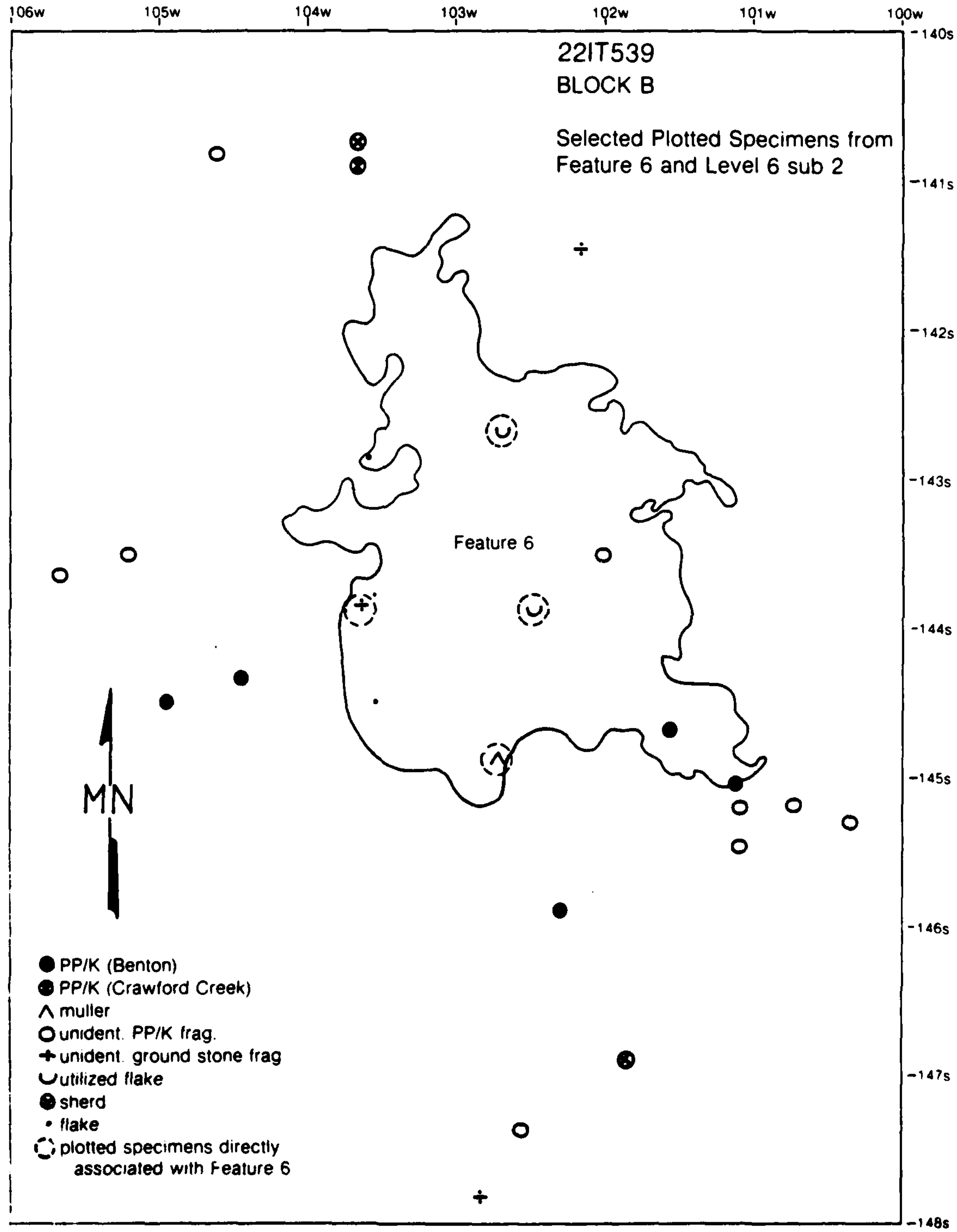


106w
105w
104w
103w
102w
101w
100w
140s
141s
142s
143s
144s
145s
146s
147s
148s
22IT539
BLOCK B
Selected Plotted Specimens from
Feature 6 and Level 6 sub 1
Feature 6
MN
PP/K (Benton)
PP/K (Residual Stemmed)
anvilstone
chopper
core
preform II
drill frag.
unident. chipped stone frag.
unident. PP/K frag.
unident. ground stone frag.
utilized flake
sherd
flake
plotted specimens directly associated with Feature 6

5.282

Figure 5.61

Site 22IT539: Selected Plotted Specimens from Feature 6, Level 6, Sublevel 2



106w
105w
104w
103w
102w
101w
100w
140s
141s
142s
143s
144s
145s
146s
147s
148s
22IT539
BLOCK B
Selected Plotted Specimens from
Feature 6 and Level 6 sub 2
Feature 6
MN
PP/K (Benton)
PP/K (Crawford Creek)
muller
unident. PP/K frag.
unident. ground stone frag
utilized flake
sherd
flake
plotted specimens directly
associated with Feature 6

5.284

Figure 5.62

Site 22IT539: Selected Plotted Specimens from Feature 6, Level 7, Sublevel 1

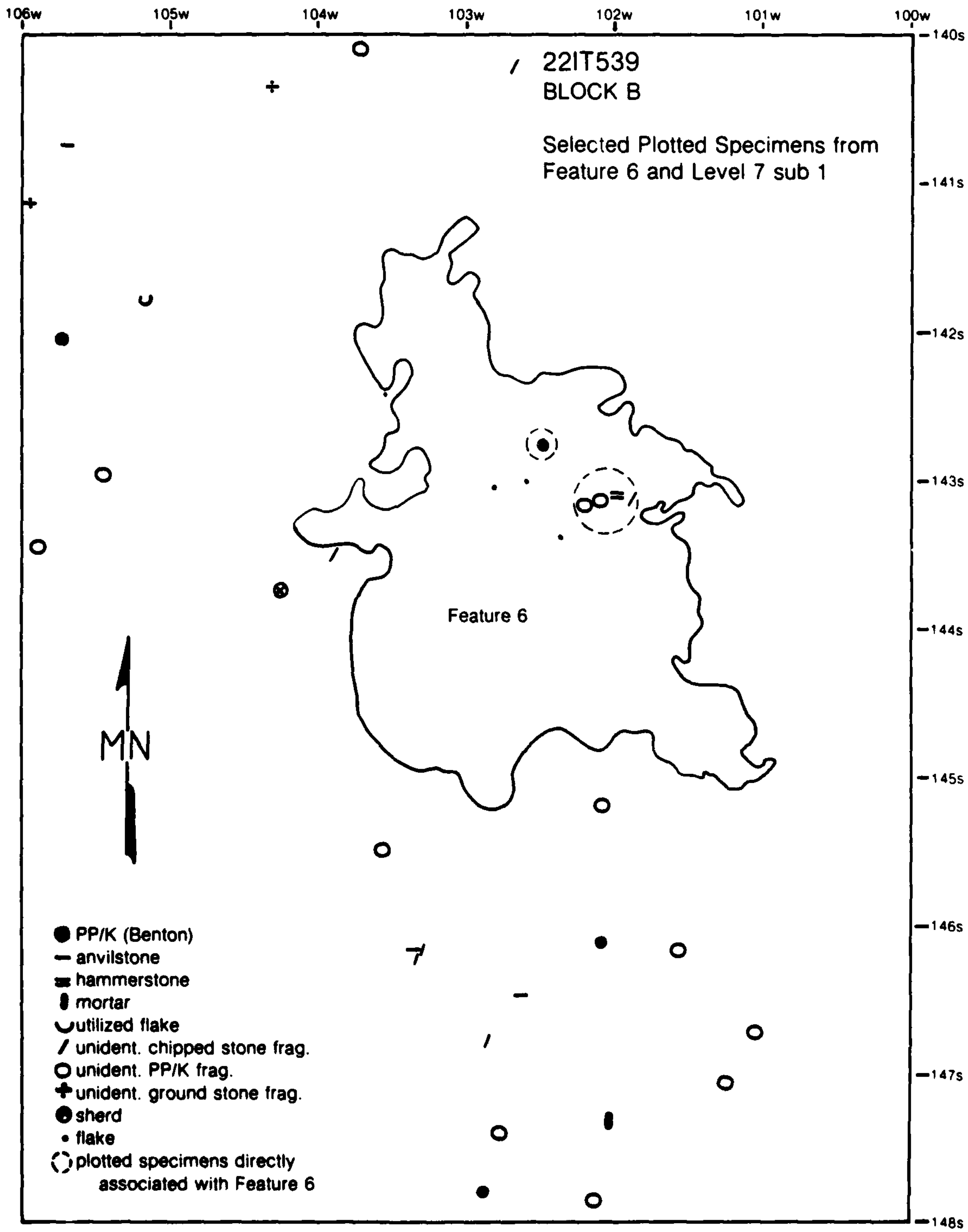
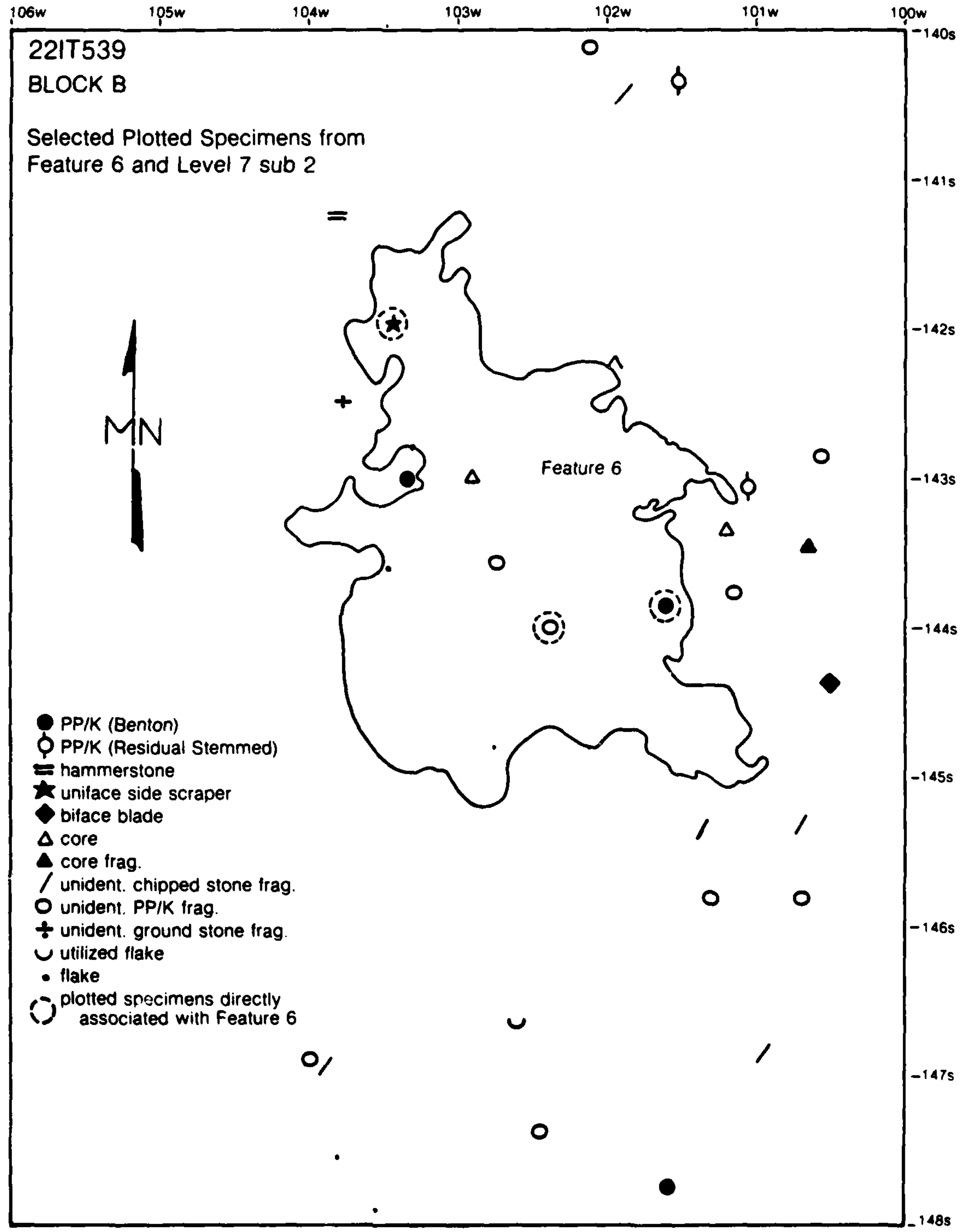

106w
105w
104w
103w
102w
101w
100w
140s
141s
142s
143s
144s
145s
146s
147s
148s
22IT539
BLOCK B
Selected Plotted Specimens from
Feature 6 and Level 7 sub 1
Feature 6
MN
PP/K (Benton)
anvilstone
hammerstone
mortar
utilized flake
unident. chipped stone frag.
unident. PP/K frag.
unident. ground stone frag.
sherd
flake
plotted specimens directly
associated with Feature 6

Figure 5.63

Site 22IT539: Selected Plotted Specimens from Feature 6, Level 7, Sublevel 2



106w
105w
104w
103w
102w
101w
100w
140s
141s
142s
143s
144s
145s
146s
147s
148s
22IT539
BLOCK B
Selected Plotted Specimens from
Feature 6 and Level 7 sub 2
MN
Feature 6
PP/K (Benton)
PP/K (Residual Stemmed)
hammerstone
uniface side scraper
biface blade
core
core frag.
unident. chipped stone frag.
unident. PP/K frag.
unident. ground stone frag.
utilized flake
flake
plotted specimens directly associated with Feature 6

5,288